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CLATSOP COUNTY HISTORICAL SOCIETY
ASTORIA, OREGON

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DRAFT



THE ASTORIA COLUMN CONSERVATION STUDY

FEBRUARY 1990

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ASTORIA COLUMN
CONSERVATION STUDY

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ASTORIA COLUMN

CONSERVATION STUDY February 1990

INTRODUCTION

Where the great Columbia River meets the Pacific Ocean, the City of Astoria, Oregon was the site of the first European settlement in the Pacific Northwest of the United States of America. Its one hundred eighty year history as a major fur trading center, a major fishing and canning center and a strategic maritime port has resulted in a city rich in cultural and architectural heritage.

The Astoria Column, completed in 1926, rises 125 feet high and 22 feet in diameter on six hundred feet high Coxcomb Hill. The column was a gift of Vincent Astor (heir to the founding trading company) and The Great Northern Railway to commemorate the settling of the Columbia River basin and the coming of the railroad. The column is visited annually by two hundred thousand tourists.

Facing the ocean and fresh water rivers on three sides, the monument has been exposed to the forces of windbourn water and particles. Peak wind gusts are estimated at 120 miles per hour. The average rainfall is 70 inches per year. Average relative humidity is 86 percent. Frequent freeze/thaw cycles occur. See ATTACHMENT I, WEATHER REPORTS.

In subsequent years, the artwork was repaired and restored by the artist and others. Several layers of water repellents have been applied.

By 1989 the artwork appeared distressed. Much of the design was not visible. Cracks, spalls, mold and lichens were visible. With access aided by complete scaffolding, the artwork was cleaned to remove mold, lichens and darkened oil coatings; samples were extracted and a detailed inspection was performed.

This report discusses the results of the 1989 Phase I treatment and inspection by Conservators of Art and Architecture, Inc. and proposes Phase II repairs and aesthetic restorations.

BACKGROUND

DESCRIPTION

The concrete structure consists of a square base, on top of which is a donut shaped carved wraith. The circular eighty-seven foot column begins above the wraith. At the top of the column is a carved egg and dart cornice followed by an observation platform. The observation platform is accessed by means of a spiral staircase located at the interior of the base and column. See Figure 1, Architects Drawing, and Figure 2, Completion Schedule Drawing. The historic background of the column construction is well described in ATTACHMENT II, (Leonard B. Kimbrell, "Some New Light on the Astoria Column", Festschrift, Northern Pacific Coast Chapter Society of Architectural Historians, 1978).

The surfaces of the column are decorated with a spiraling sgraffito design depicting the scenes and events of the subject era. See Figure 3, Artist's Scale Model. Bold lettering on a spiral band describes each scene. See Figure 4, Lettering, and Figure 5, Cupola Drawing with lettering.

The architect Electus D. Lichtfield designed the column, selected the artist and acted as liaison between the artist and Ralph Budd, then President of the Great Northern Railway, who managed the project.

ARTIST

The artist Attilio Pusterla was born in Milan, Italy on 10 July 1862, he died in Woodley, New York on 30 April 1941. Trained in art at the prestigious Brera Academy of Art in Milan, his best known work in Europe is the impressionist style painting "Alle Cucine Economiche di Porta Nuova" ("The Soup Kitchens of Milan") presently in the possession of the Museum of Modern Art in Milan, Italy. See Figure 6. On moving to America in 1898 he executed artworks in the traditional Italian technique of sgraffito as well as easel paintings in oil and watercolor. See References 1 through 7.

MATERIALS AND TECHNIQUES

See ATTACHMENT III, STRATA and ATTACHMENT IV, ANALYSIS.

The monument was built of poured concrete. Both vertical and horizontal re-bar was used. See Figure 7. After completion, the concrete was coated with a layer of grey cement mortar. The quality of design, materials and workmanship represent the finest state of the art construction for that period.

Because the spiraling artistic design was dependent on precise column measurements, the artist found it necessary to adjust his large cartoons (full size transfer patterns, destroyed around 1927) to the variations in column width, as the column diminished slightly with height to compensate for visual distortion. The artist completed two spirals at the top in time for the grand opening on 22 July 1926. He then completed the remainder of the decoration in early November 1926.

Sgraffito is the technique of applying layers of pigmented plaster, then carving lines through the layers to reveal the colors below. On the Astoria Column the artist applied a chocolate brown base color of pigmented portland cement, followed by a thin layer of light tan, yellow or white. The result was a pale, matt, pastel painting with dark lines separating design elements. Some of the designs were quite intricate and not readily visible from the ground.

Unique to the Astoria Column is the fact that the artist carved well into the brown underlayer. See simplified cross section sketch below. Years later, in 1936, when the outer layers had deteriorated, it was these carvings that permitted the artist to re-apply colors in the original design patterns. The presence of these carvings in 1989, when the outer layer has once again deteriorated away, will permit replacement of colors, in most areas, by precisely following the original design.

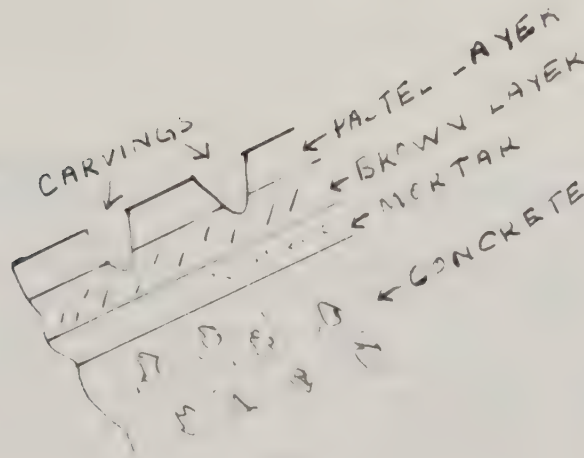


Figure 8

CROSS SECTION OF COLUMN AND ARTWORK

When executing the artwork on the Astoria column, the artist adapted traditional Italian technique for use with portland cement plaster. The chocolate brown base coat was applied with a formula containing dark river sand, pigment and portland cement. He then carved his designs into the still soft cement plaster. With a hanging scaffolding that did not permit control of cure in an unusually wet summer, he applied the thin outerlayer colors of sea, sky, skin, etc, with a high lime content plaster which could be mixed and applied smoothly and rapidly. The formula was highly porous and ill adapted to the Astoria climate. It began to deteriorate with loss and staining within one year after completion. See Figures 8 to 18.

PAST TREATMENTS

See ATTACHMENT III, STRATA and ATTACHMENT IV, ANALYSIS.

In 1936, at the age of 74, the artist returned to Astoria to supervise a restoration of the artwork. With his assistant acting as foreman, and with the labor of local workers, the damaged artwork was removed by application of a hydrochloric acid solution. The light colored plaster coating was re-applied. Again working on scaffolding that did not permit control of curing and under time and weather constraints and with numerous hands mixing small batches of plaster, there is a wide range of color, thickness, hardness and durability. The artist reworked some of the design with a black color coated with an oily tar to exaggerate some of the dark lines and shadows near the lower portions of the column. The entire column was then coated with a water repellent, probably a stearate of the type used in the 1930's . The areas in dominant weather directions, west and south, did not cure under desirable conditions, were therefore weaker and soon deteriorated again.

During the summer of 1936, with his own hands, the artist executed a design in a similar technique above the garage of the home he occupied in nearby Warrenton. This design is now painted over. Samples of this work were found to be of greater uniformity and density than the work executed on the monument.

On completion of the restoration of 1936 the artist requested that the monument be treated with a water repellent every five years.

In 1948 a coating of tung oil water repellent was applied to the artwork.

In 1958 another coating of tung oil was applied.

In 1968 the medallions were repainted with a latex paint.

In 1968 cracks were injected with an epoxy grout, the structure was reenforced by application of steel bars and shot-crete on the inside of the column.

In 1989 the column was treated to remove mold, lichens and layers of darkened oils. The carvings were marked with white chalk to exaggerate the design intricacies, then photographed in detail. Partial and full face photographs were executed.

See ATTACHMENT V, PHASE I PRESERVATION TREATMENT REPORT. See Figures 19 to 26, Full Face Photographs and Figures 27 to 54, Photographs of Sections of Each Face.

CONDITION

See ATTACHMENT V, PHASE I PRESERVATION TREATMENT REPORT

The condition of the monument during the 1989 inspection was:

MOLD

Mold was evident on one hundred per-cent of the surface. The mold was treated and removed in the 1989 treatment. See Figures 55 and 56, before and after moldicide treatment, respectively.

LICHENS

A spray of light grey lichens were evident on the upper portions of the north-east face. These were removed in the 1989 treatment. The artwork under the lichens was damaged as the plaster provided food for the lichens.

BLACK ALGAE

Circular spots of black algae was evident in a few small areas.

SHRINKAGE CRACKS

Shrinkage cracks on the brown layer are visible in some areas. When properly covered by a new outer layer of pigmented plaster, they pose no harm. See Figure 57, shrinkage cracks in brown layer.

PLATFORM DRAINAGE

Improper drainage on the observation platform has caused staining on the painted cornice. See Figure 58

EROSION OF INCISIONS

About five per-cent of the brown base coat has eroded to the depth of carvings, the design is lost except for clues given in historic photographs and the extant scale model. The erosion is specifically in areas exposed to the most extreme wether on the north and south faces or where the brown layer was applied in to thin a layer. See Figure 59 Photograph, eroded area.

LOSSES OF SEA AND SKY

About thirty per-cent of massive areas of sea and sky backgrounds are missing, primarily on the west and south where delimitation was aided by differential thermal expansion. See Figures 60, 61, 62.

SPOT LOSSES

About twenty per-cent of the artwork has losses of small spots of color. These are in areas that were not well prepared during the 1936 restoration. See Figures 63 through 70

INTACT ARTWORK

The remainder of the 1936 restoration is intact without need of treatment, other than regular preventive care. See Figures 63, 64, 65, 66.

REMAINING ORIGINAL PLASTER

Original 1926 plaster is visible in some areas, mostly where the 1936 restorers did not remove the original, but applied new plaster over the old. The new plaster did not adhere well and delaminated with time or as a result of the 1989 cleaning.

Existing original colors are bleached as a result of the acidic treatment in 1936.

VERTICAL CRACKS

See ATTACHMENT VI, INSPECTION NOTES, STRUCTURE.

Vertical cracks through the concrete which run the full length of the south, east and west face are caused by temperature fluctuations in those directions. The north face, having a more stable temperature is not cracked. The cracks follow the lines etched in the brown layer by the artist to serve as register lines for his full size cartoons. The cracks were previously filled with an epoxy grout which has deteriorated and separated as the cracks continue to move as self made, and necessary, expansion joints. See Figure 67.

SPALLS

Several spalls are present on the southeast face. Some have been previously patched, some of the patches are deteriorated, some spalls are untreated. The spalls appear to be located where the re-bar was tied, and possibly slipped close to the surface. Moisture would cause the metal to rust, expand and damage the concrete. See Figure 68.

BLIND VOIDS

Blind voids under the brown layer were revealed by tapping. They do not appear to be in danger of eminent failure.

OIL COATINGS

The layers of tung oil water repellent, which initially gave an artificial brightness to the artwork, have swelled and discolored to a dark amber, obscuring the color and design and preventing a valid assessment of the condition of the surface and the extent of color loss. The tung oil was removed during July and August of 1989. See Figure 69.

SCULPTED WRAITH

The sculpted bas relief, circling the base of the column is obscured by layers of paint. See Figure 70.

TREATMENT RECOMMENDATIONS

Our approach to the preservation of a monument is: firstly, to assure structural safety;...then, to make the artwork and substrata healthy by removing harmful or unaesthetic additions;... then, to correct defects in materials;...and finally, to apply aesthetic restorations. In following this sequence our standards conform to international standards and ethics for the conservation of artistic monuments, which are;

- Do no harm to the original materials
- Added materials will be chemically reversible, where feasible
- Added materials will not preclude future treatments
- Restorations will respect the original artist without modern interpretation and will not obscure the original work.

PROPOSED TREATMENT

CLEAN AND FILL CRACKS

Remove all deteriorated and unsightly previous restorations, soil and algae from cracks. Fill cracks with a pigmented silicone elastomeric grout. Specification to be determined by conservator at time of treatment.

CLEAN AND FILL SPALLS

Remove deteriorated and unsightly previous restorations, soil and algae from spalls. Fill material to match brown base coat in color and texture. Formula for fill to be determined by conservator at time of treatment.

REMOVE OILS

Oils that may have migrated to the surface after the 1989 cleaning and soil that may have accrued since the 1989 cleaning may have to be removed before application of color layers.

TREAT BLACK ALGAE

Treat small areas of black algae, with spores deep inside the pores of the concrete. Material and strength to be determined by the conservator at the time of treatment.

APPLY COLOR FOLLOWING THE EXTANT DESIGN EXECUTED BY THE ORIGINAL ARTIST.

Figures 79 through 91 indicate the variety of design and intricacies of details.

The methods of coloring concrete are:

- OPTION I: PREFERRED: PIGMENTED CEMENT PLASTER, SOMETIMES WITH RESIN ADDITIVE TO AID ADHESION AND EASE OF APPLICATION. THIS IS THE ONLY SYSTEM WHICH FULFILLS THE REQUIREMENTS OF
- A.) APPEARANCE SIMILAR TO ORIGINAL ARTWORK,
 - B.) WIND RESISTANCE,
 - C.) FREEZE/THAW RESISTANCE,
 - D.) VAPOR PERMEABILITY.

In applying pigmented plaster, selection of mixture, layer thickness and number of layers must be made at the site. If the mix contains too much resin additive the desirable vapor permeability would be compromised. Correct, durable curing will be a function of layer thickness, location on the monument and daily weather.

- OPTION II: ACRYLIC EMULSION PAINT FILMS WHICH LAY ON TOP OF THE CONCRETE. IMPROVED IN RECENT YEARS, BUT OFFER LITTLE PROTECTION FROM THE ELEMENTS AND POOR ADHESION TO A SLIGHTLY OILY SURFACE.

- OPTION III: STAINS, WHICH PENETRATE THE PORES OF THE CONCRETE, LIMITED IN COLOR, POOR ADHESION TO AGED CEMENT AND OFFERING NO PROTECTION FROM WEATHER ELEMENTS.

- OPTION IV: REACTIVE PAINTS, WHICH REACT CHEMICALLY AND PHYSICALLY TO BECOME A PERMANENT PART OF THE SURFACE. THEY OFFER NO PROTECTION FROM WEATHER ELEMENTS.

WRAITH AT BASE OF COLUMN

Remove overpaint from wraith at base of column to reveal intricate design. The paint remover will be of solvent base with a neutral pH.

PLATFORM DRAINAGE

Re-slope platform and provide directed drainage.
(By City of Astoria.)

ORIGINAL DOOR (OPTIONAL)

Replace entry door with one of a design similar to that designed by the original architect.

SCAFFOLDING:

The scaffolding should be designed to prevent rain and wind gusts from disturbing the curing process of the restorations. The plastic covering normally used on scaffolding does not endure the violent winds at the column site. There are two design options that might fulfill this purpose.

OPTION I: Scaffolding will be five feet deep. Wood boards will enclose the exterior of the scaffolding. This option would necessitate interior lighting.

OPTION II: Scaffolding will be ten feet deep. The depth of overhangs may protect the column surface from wind and rain.

In addition:

Scaffolding will provide access to all painted surfaces, with eight to twelve inches of clearance between scaffolding and surface.

Scaffolding will not touch any part of the painted surfaces on the elevation to be treated.

Scaffolding will not damage any part of the surface.

Scaffolding will include an interior staircase.

Scaffolding will be stable to wind and movement of personnel and equipment.

Scaffolding will contain Interior stairs.

Scaffolding will have safety braces on the exterior of all levels.

QUALIFICATION OF WORKERS

MASTER CONSERVATOR

All materials, techniques and workmanship will be as directed by the Master Conservator. The Master Conservator will be qualified by ten years of training and experience specialized in the preservation and conservation of artistic and architectural monuments.

ASSISTANT CONSERVATORS

Two assistant conservators will be fully trained in the conservation of artistic and architectural monuments.

APPRENTICE CONSERVATOR

One apprentice conservator with a background in chemistry, studio arts and the ethics of conservation and historic preservation.

JOURNEYMAN PLASTERER

One plasterer with experience in the mixing and application of pigmented plaster.

SCHEDULE

PLANNING AND PREPARATION: Allow three months.

ON-SITE WORK: Allow three months , including weather contingencies.

TREATMENT REPORT AND MAINTENANCE PLAN: Allow four months.

COSTS:

See ATTACHMENT VII, COSTS

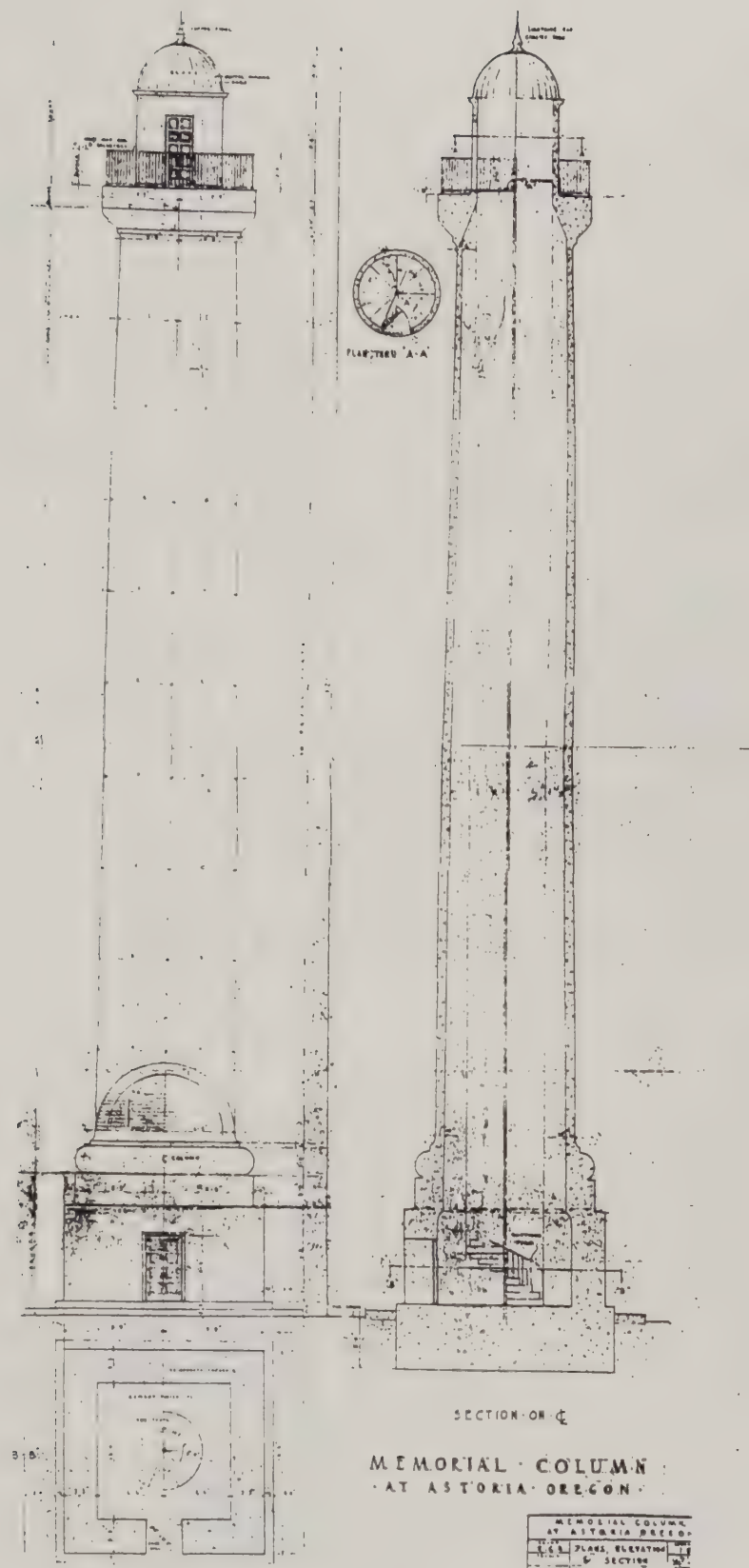


Fig. 1A Detail of Architect's Drawing

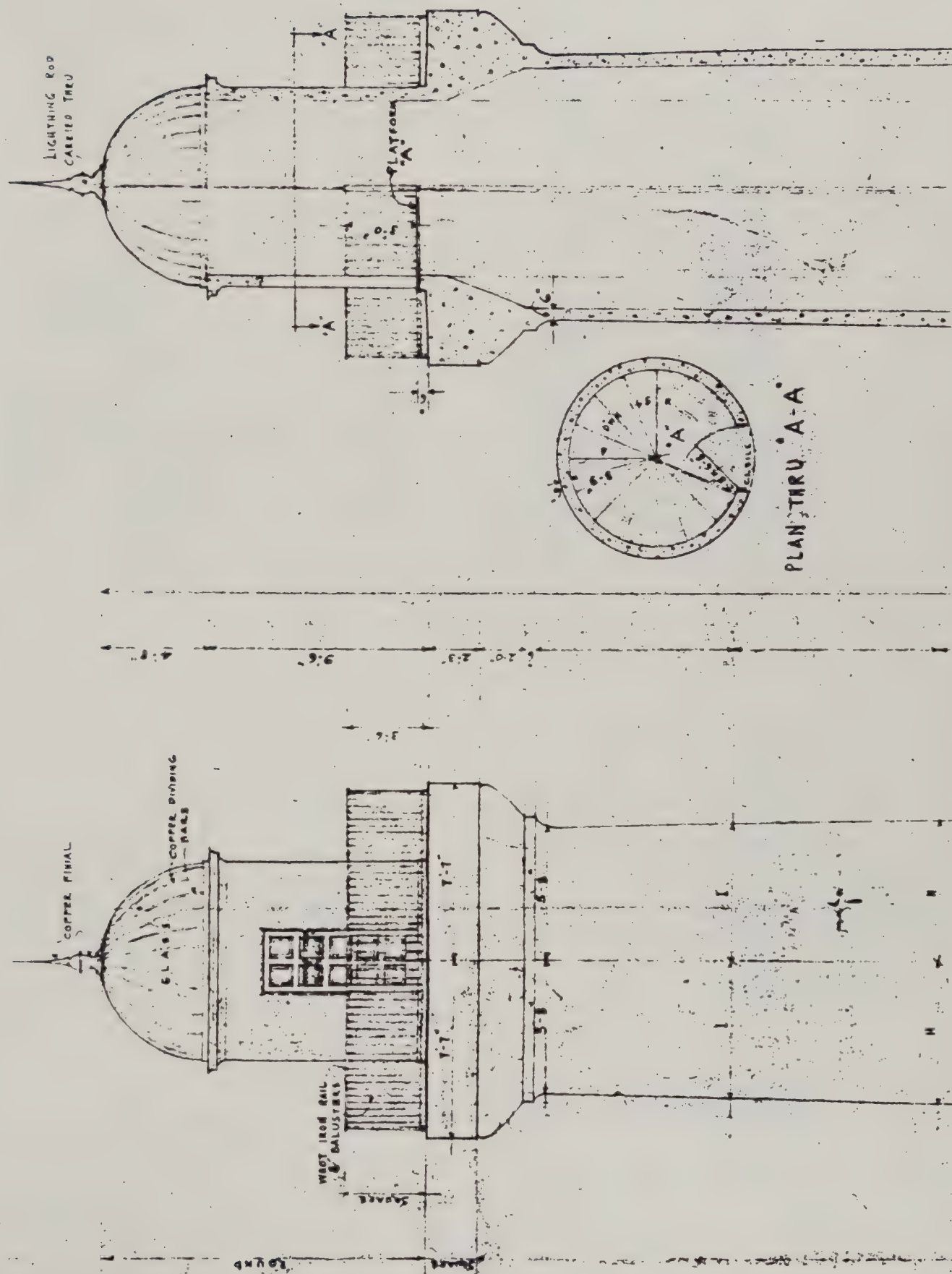
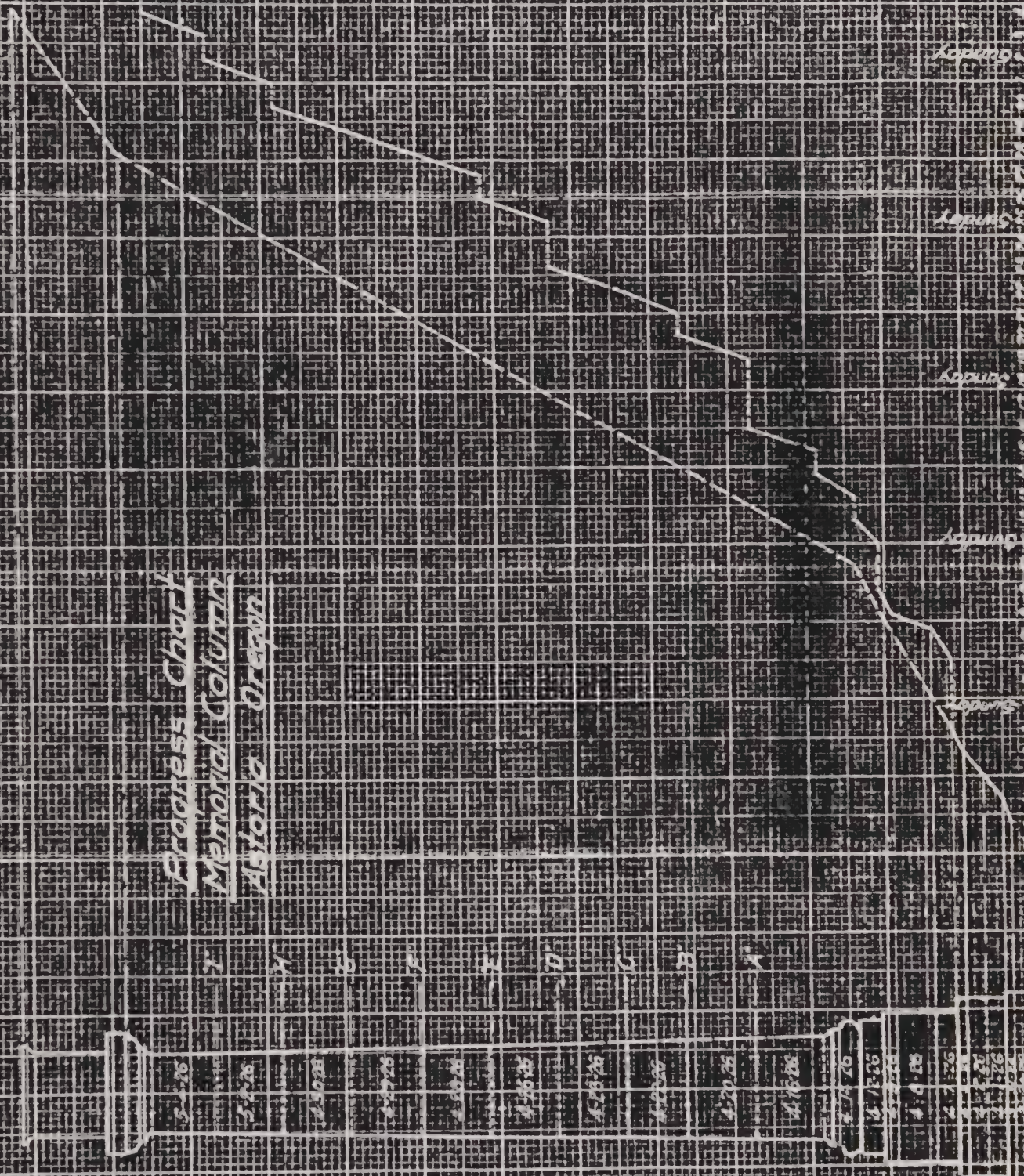


Fig. 1A Detail of Architect's Drawing

April

March



Progress Chart

Memorial Column

Astoria Oregon

Progress Chart

Memorial Column

Astoria Oregon

Progress Chart

Memorial Column

Astoria Oregon



Coming of the Settler and Civilization

Fort Astoria Restored to the United States, 1818

Fort Astoria Sold to the British and Renamed Fort George, 1813

Pacific Fur Company Ship Tonquin Blown Up at Vancouver Island, 1811

Pacific Fur Company Overland Party Arrives at Astoria, 1812

Ship Tonquin Arrives at Astoria, 1811. Building Fort Astoria

John Jacob Astor's Pacific Fur Company Ship Tonquin Sails from New York, 1810

Lewis and Clark Expedition Builds Fort Clatsop and Spends Winter of 1805-1806 on Lewis and Clark River Near Astoria

Lewis and Clark Expedition Boiling Sea Water to Obtain Salt

Lewis and Clark Expedition, First to Cross the Continent, Arrives at Astoria, 1805

Discovery of the Columbia River by Captain Robert Gray in Ship Columbia, 1792

Before the White Man—the Forest Primeval

Fig. 3 Artist's Scale Model, Not Precisely As Built

ORIGINAL AT ASTORIA CITY HALL

"MEMORANDUM ABOUT INSCRIPTIONS ON ASTORIA COLUMN

Beginning at the bottom

BEFORE THE WHITE MAN CAME. ROBERT GRAY IN THE SHIP COLUMBIA
IN THE GREAT RIVER OF THE WEST, MAY 11, 1792. GRAY FINDS AN
INDIAN VILLAGE ON THE BANK OF THE RIVER. LIEUTENANT BROUGHTON
NAMES MOUNT HOOD, OCTOBER, 1792. THE LEWIS AND CLARK
EXPEDITION CROSSING THE MOUNTAINS. COBAWAY GREETES THE
EXPLORERS. LEWIS AND CLARK REACH THE PACIFIC. THEY OBTAIN
SALT BY BOILING SEA WATER. FORT CLATSOP ESTABLISHED DECEMBER,
1805. FORT CLATSOP IS COMPLETED. INDIAN FISHING AND BOAT
BUILDING INDUSTRY. ASTOR OVERLAND PARTY LEAVING ST. LOUIS.
TONQUIN SAILS FROM NEW YORK SEPTEMBER 8, 1810. TONQUIN ARRIVES
AT MOUTH OF COLUMBIA, SPRING OF 1811. BUILDING FORT ASTORIA.
OVERLANDERS CROSS THE DIVIDE LED BY WILSON PRICE HUNT.
DESTRUCTION OF THE TONQUIN, SUMMER OF 1811. FIRST OVERLAND
ASTORIANS ARRIVE. ARRIVAL OF THE LOST OVERLANDERS. TRANSFER
OF ASTORIA TO THE NORTH WEST COMPANY, OCTOBER, 1813. UNITED
STATES SHIP ONTARIO RAISES AMERICAN FLAG 1818. COMING OF THE
PIONEERS 1841-1848. THE RAILWAY ARRIVES, 1893."

(from the Presidents' files of the Great Northern Railway,
archived at the Minnesota Historical Society, Saint Paul,
Minn.)

Fig. 4Memorandum About Inscriptions on Astoria Column

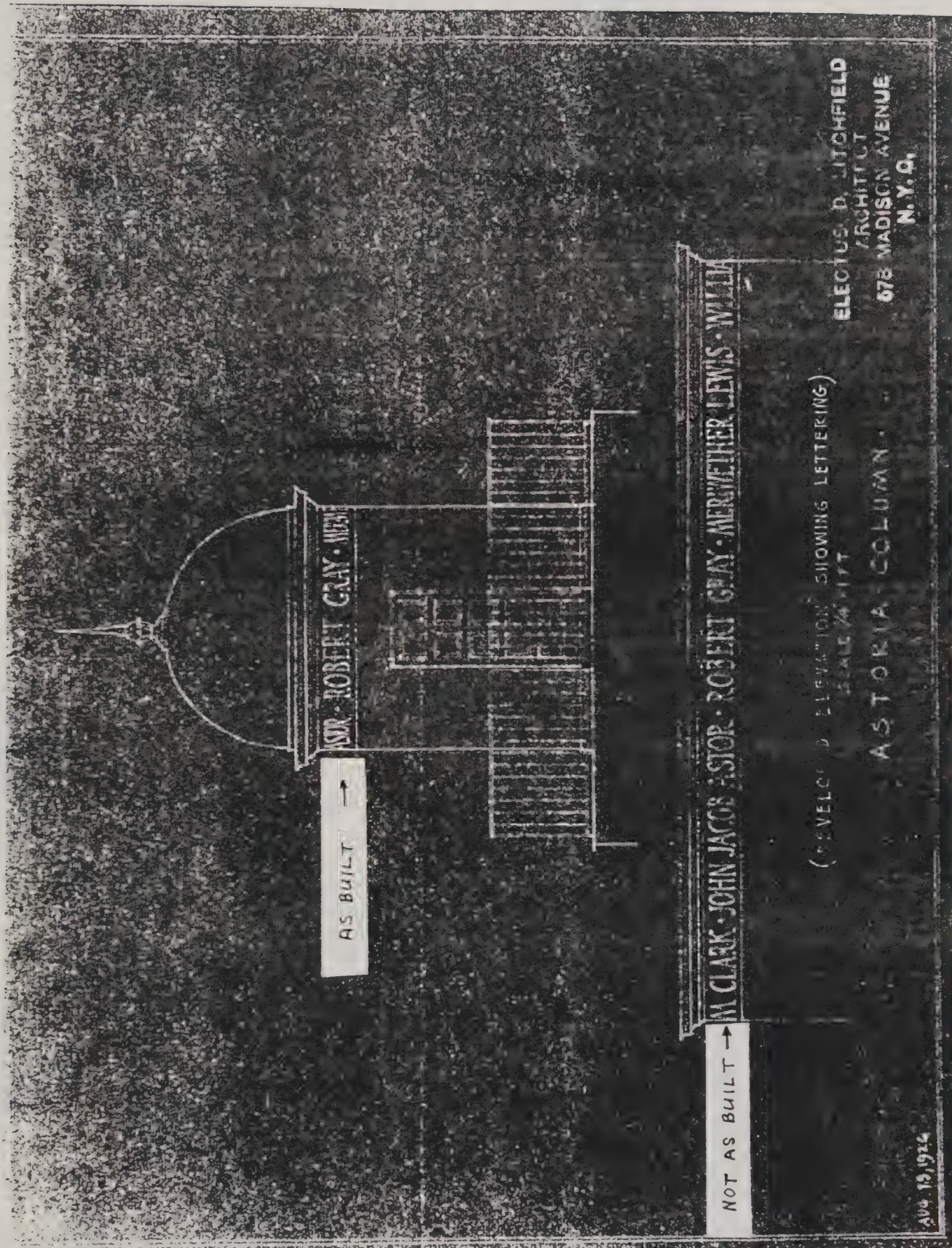


Fig. 5 Lettering on Cupola



Fig. 6 Photo "The Soup Kitchens of Porta Nuova" by Attilio Pusteria.



Fig. 7 Photo Astoria Column Southwest Face,
In Construction- 1926



Fig 8 Photo Astoria Column West Face,
In Progress-1926

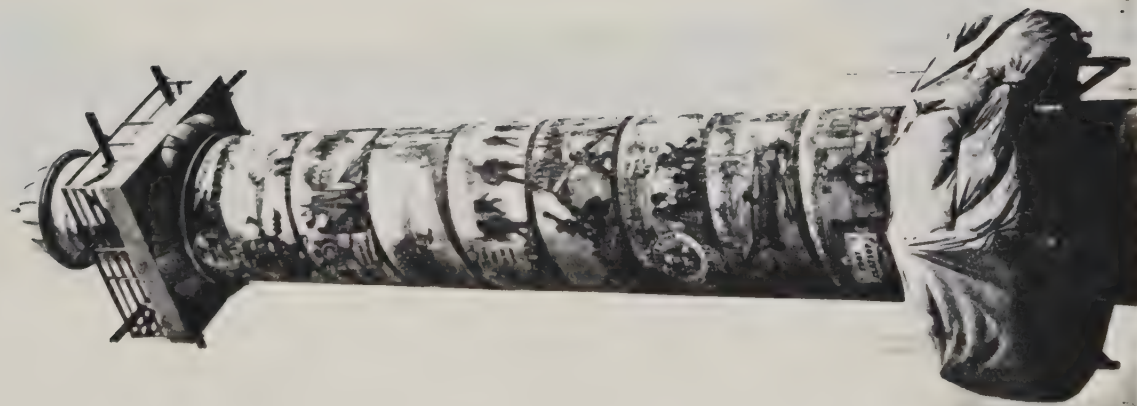


Fig. 9 Photo Astoria Column Southwest Face,
In Progress-1926



Fig. 10 Photo Astoria Column South Face,
In Progress-1926

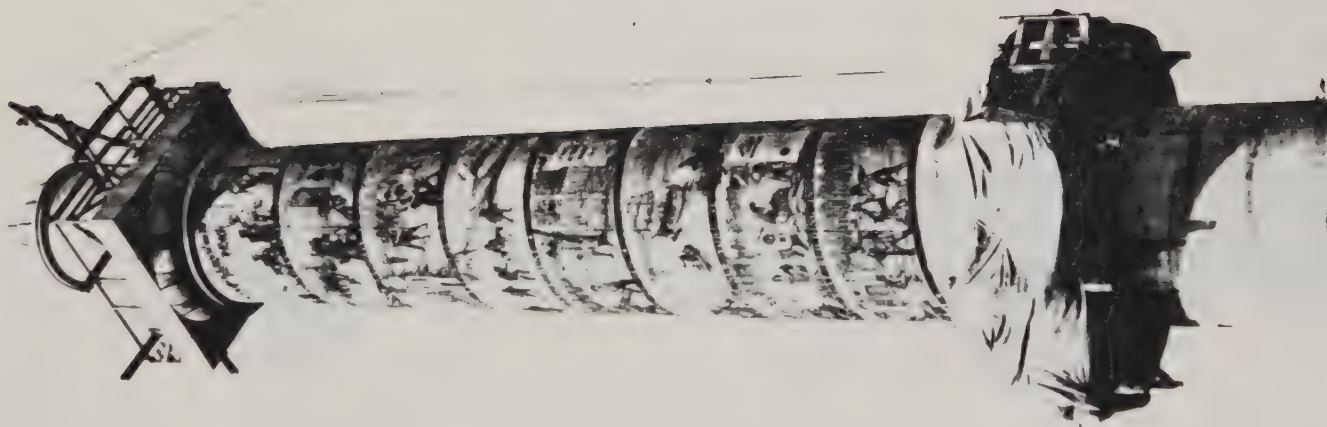


Fig. 11 Photo Astoria Column Southeast Face,
1926 In Progress-

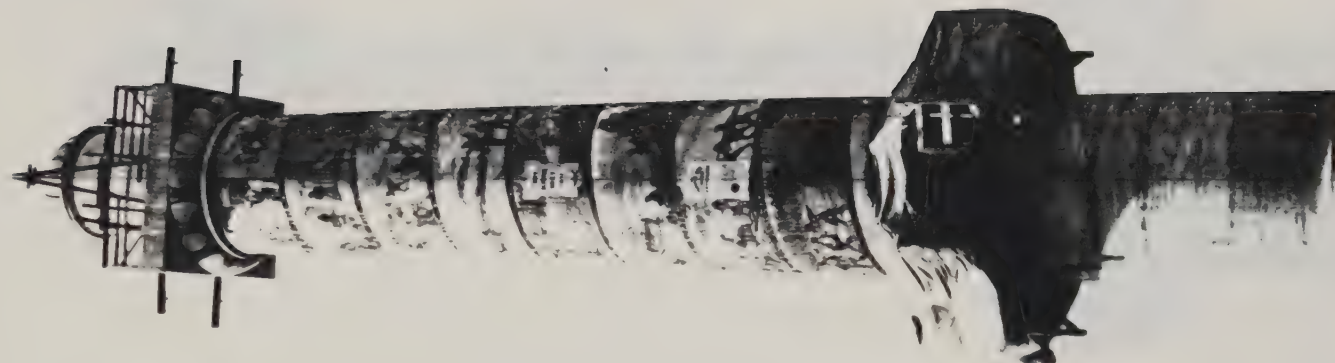


Fig. 12 Photo Astoria Column East Face,
In Progress-1926

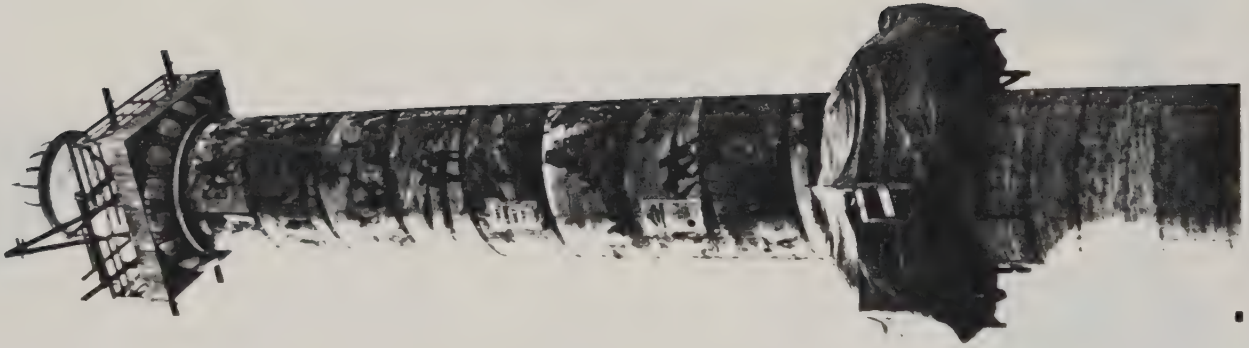


Fig. 13 Photo Astoria Column Northeast Face,
1926 In Progress-



Fig. 14 Photo Astoria Column North Face,
In Progress-1926



Fig. 15 Photo Astoria Column West Face-1926



Fig. 16 Photo Astoria Column East Face-1926?



Fig. 17 Photo Astoria Column West Face Completed Artwork-
1926



Fig. 18 Photo Astoria Column West Face-1927? Note drip stains.



Fig. 20 Photo Astoria Column Northwest Face-JAN 1990



Fig. 21 Photo Astoria Column West Face-JAN 1990



Fig. 22 Photo Astoria Column Southwest Face-JAN 1990



Fig. 23 Photo Astoria Column South Face-JAN 1990

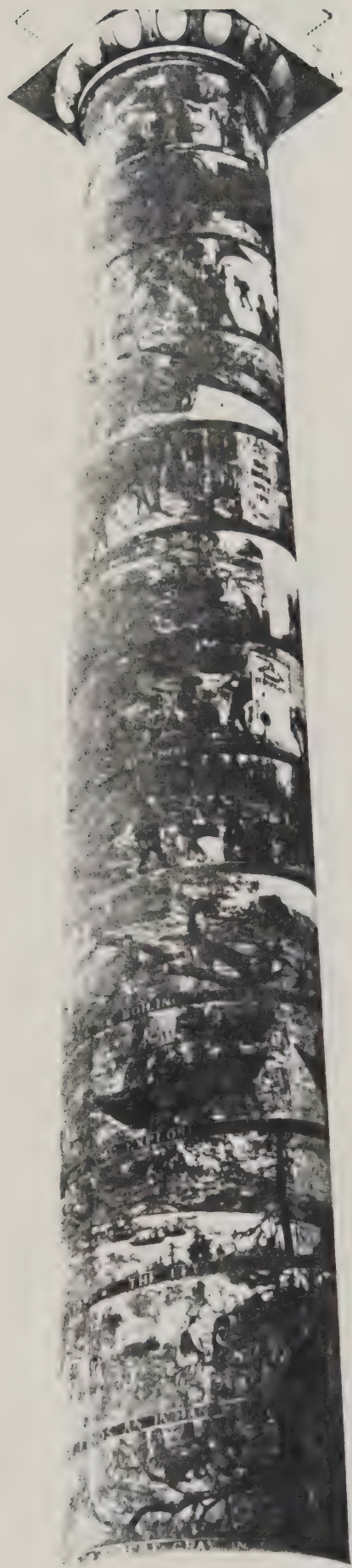


Fig. 24 Photo Astoria Column Southeast Face-JAN 1990



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Fig. 25 Photo Astoria Column East Face -JAN 1990



Fig. 26 Photo Astoria Column Northeast Face -JAN 1990

Fig. 27 Photo Astoria Column North Face Section-OCT 1989

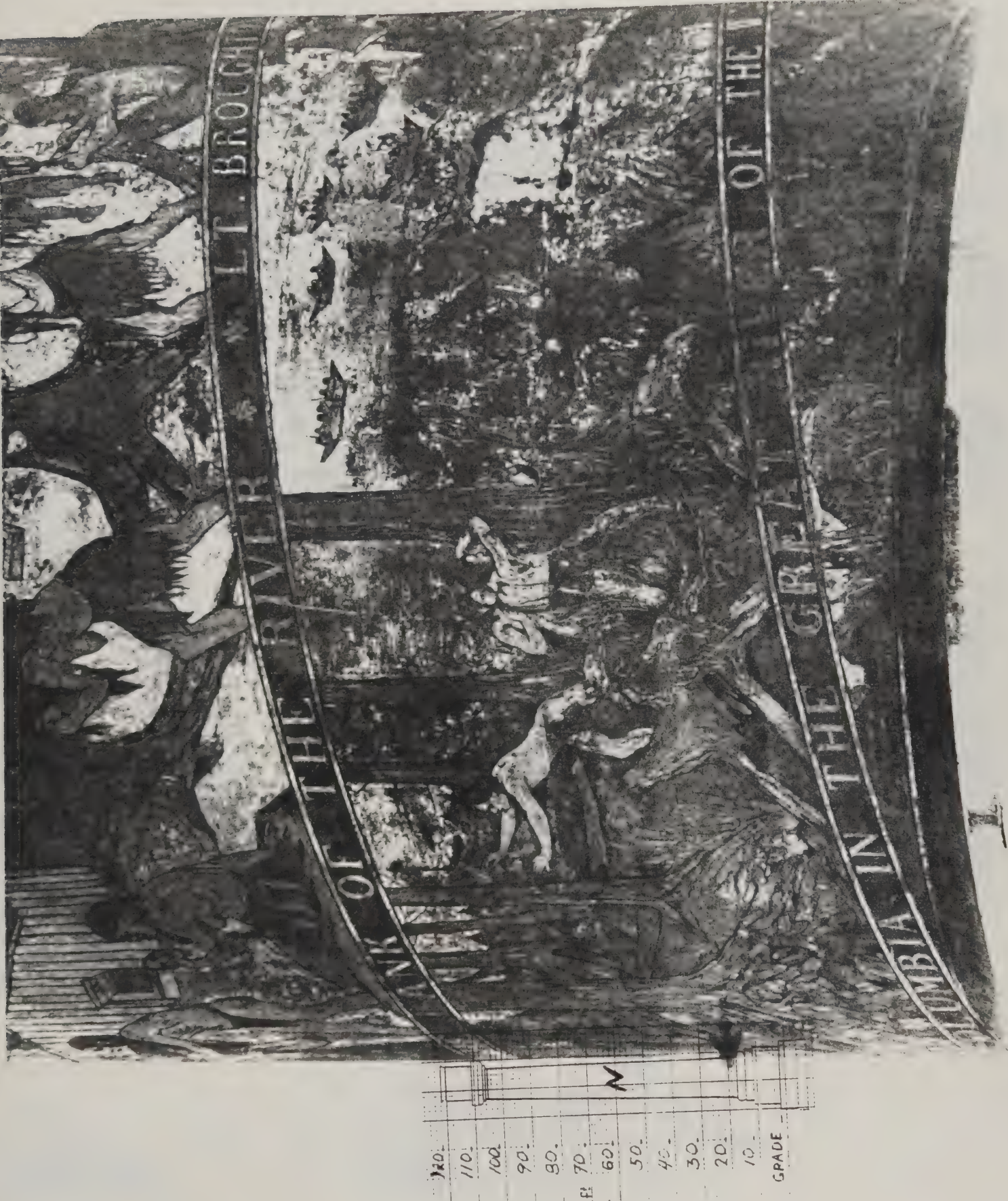


Fig. 28 Photo Astoria Column North Face Section-OCT 1989

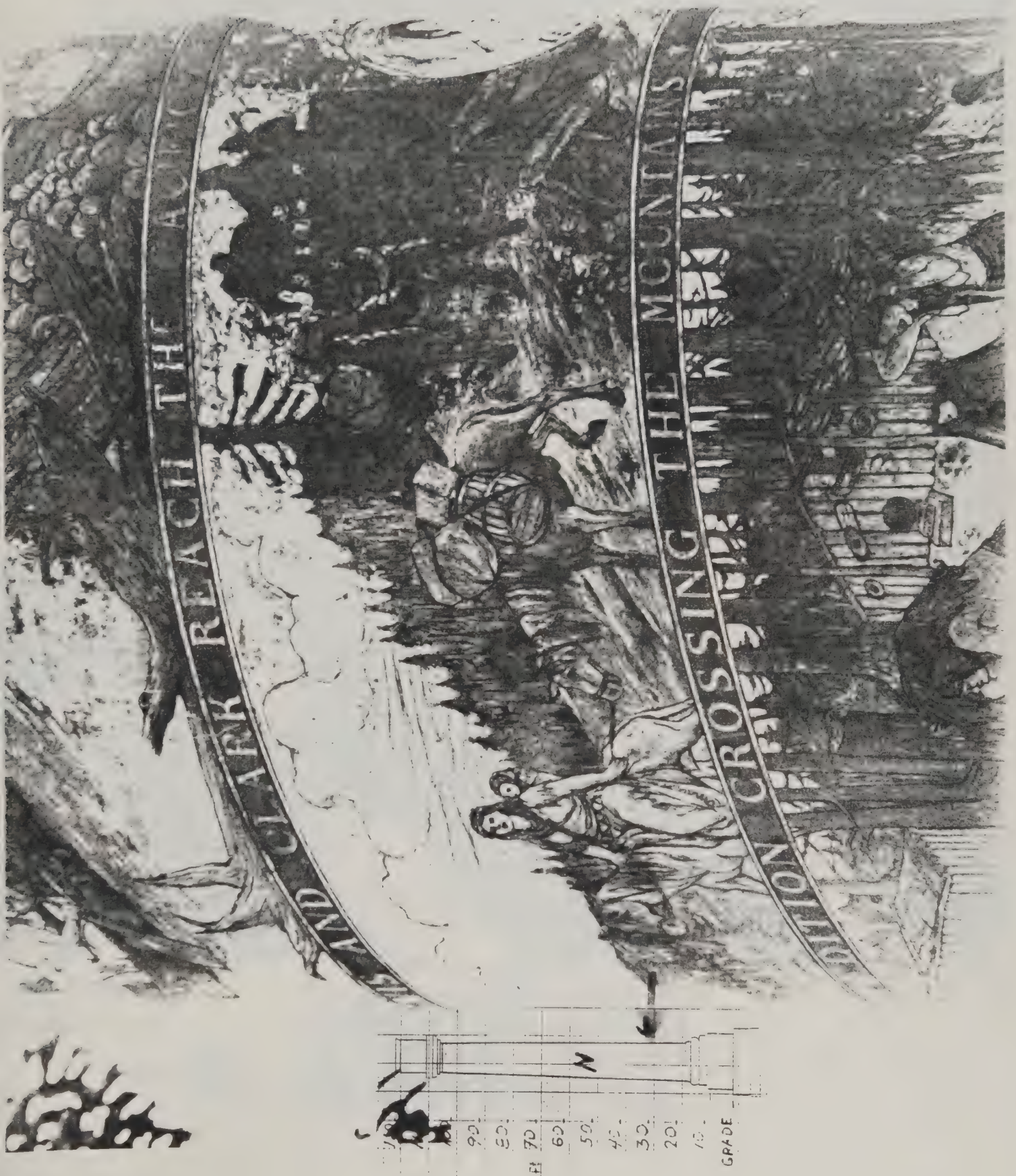


Fig. 29 Photo Astoria Column North Face Section-OCT 1989

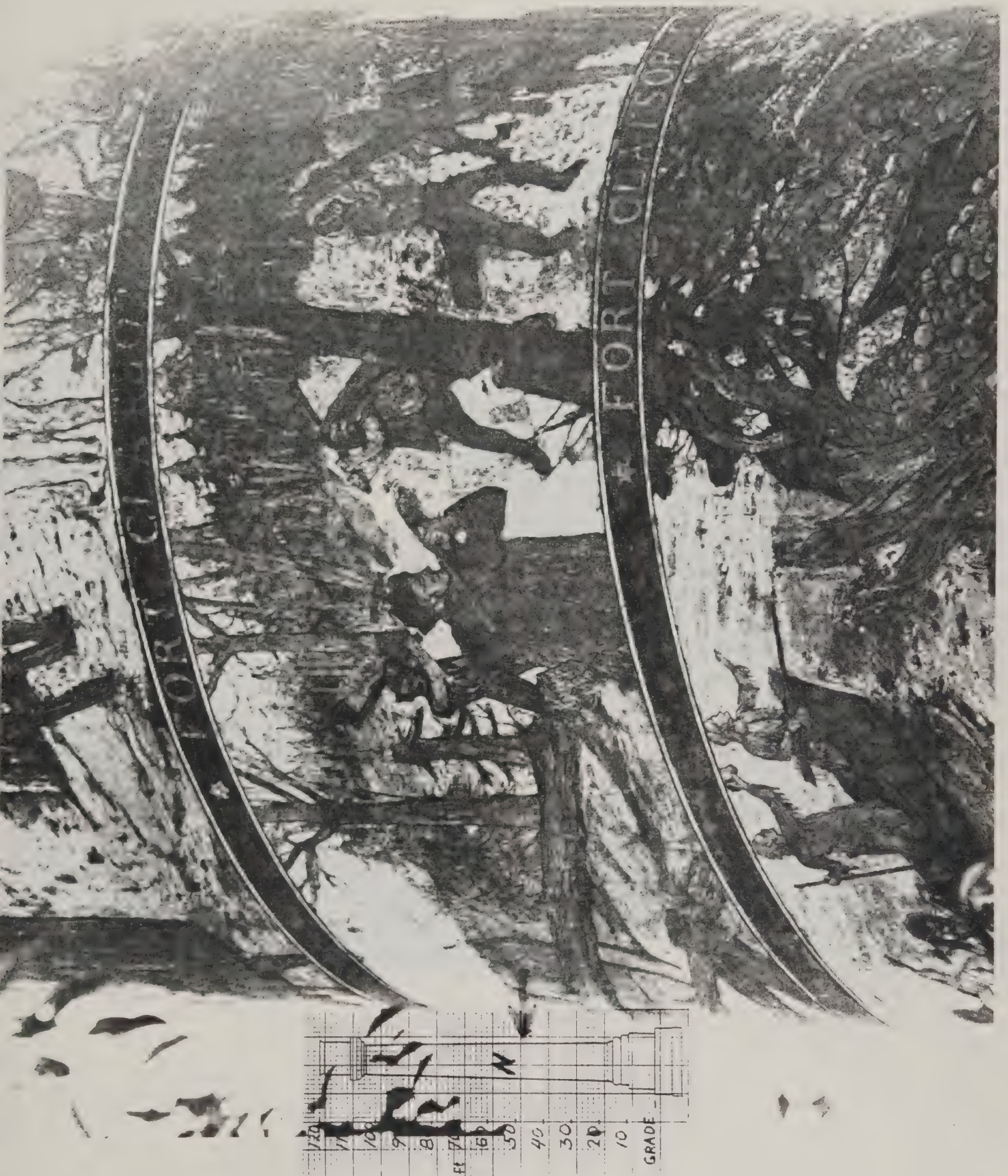


Fig. 30 Photo Astoria Column North Face Section-OCT 1989

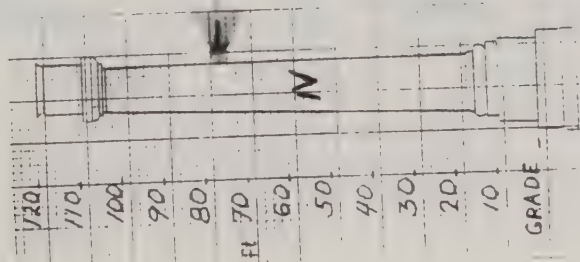
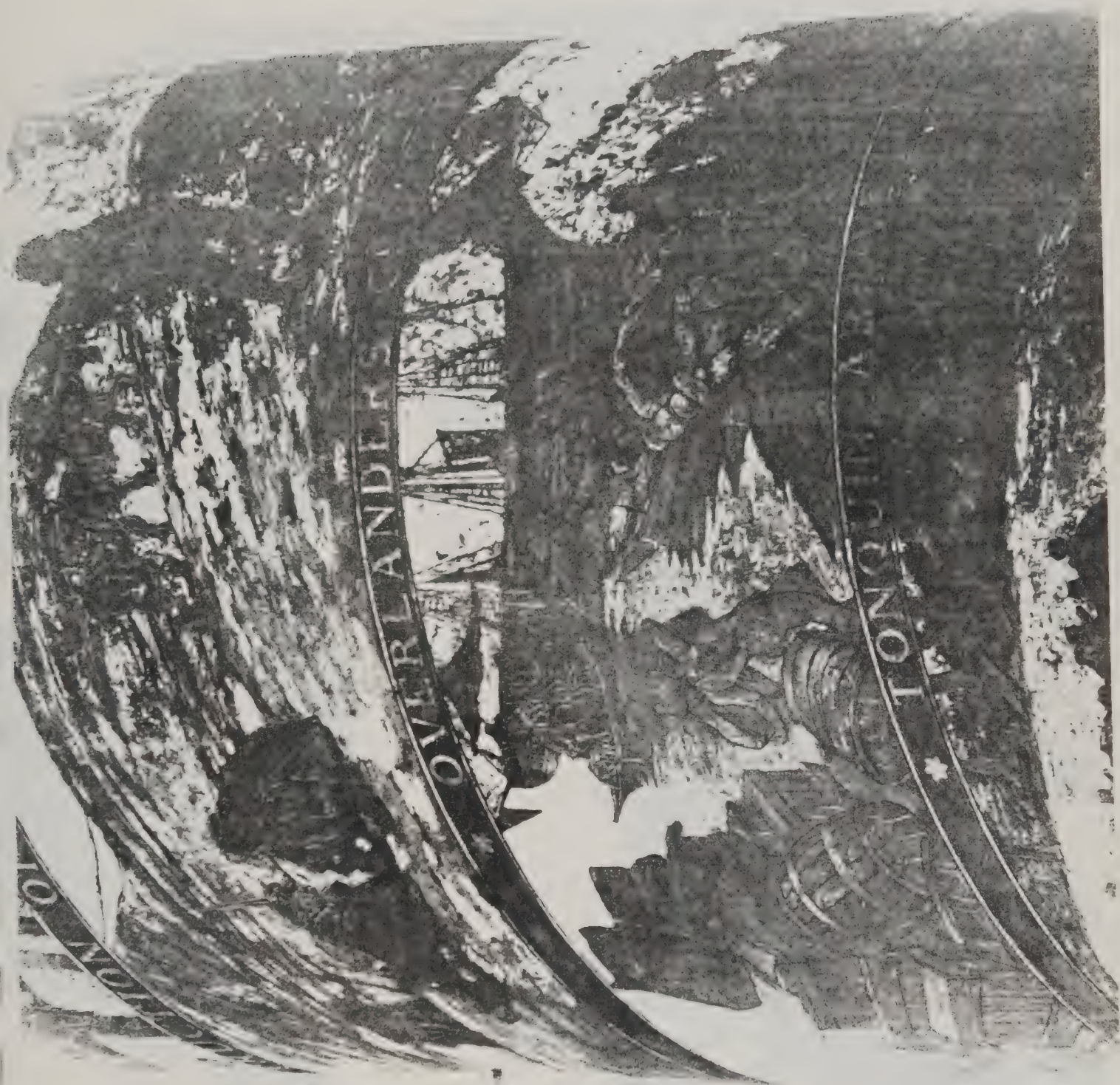


Fig. 31 Photo Astoria Column North Face Section-OCT 1989

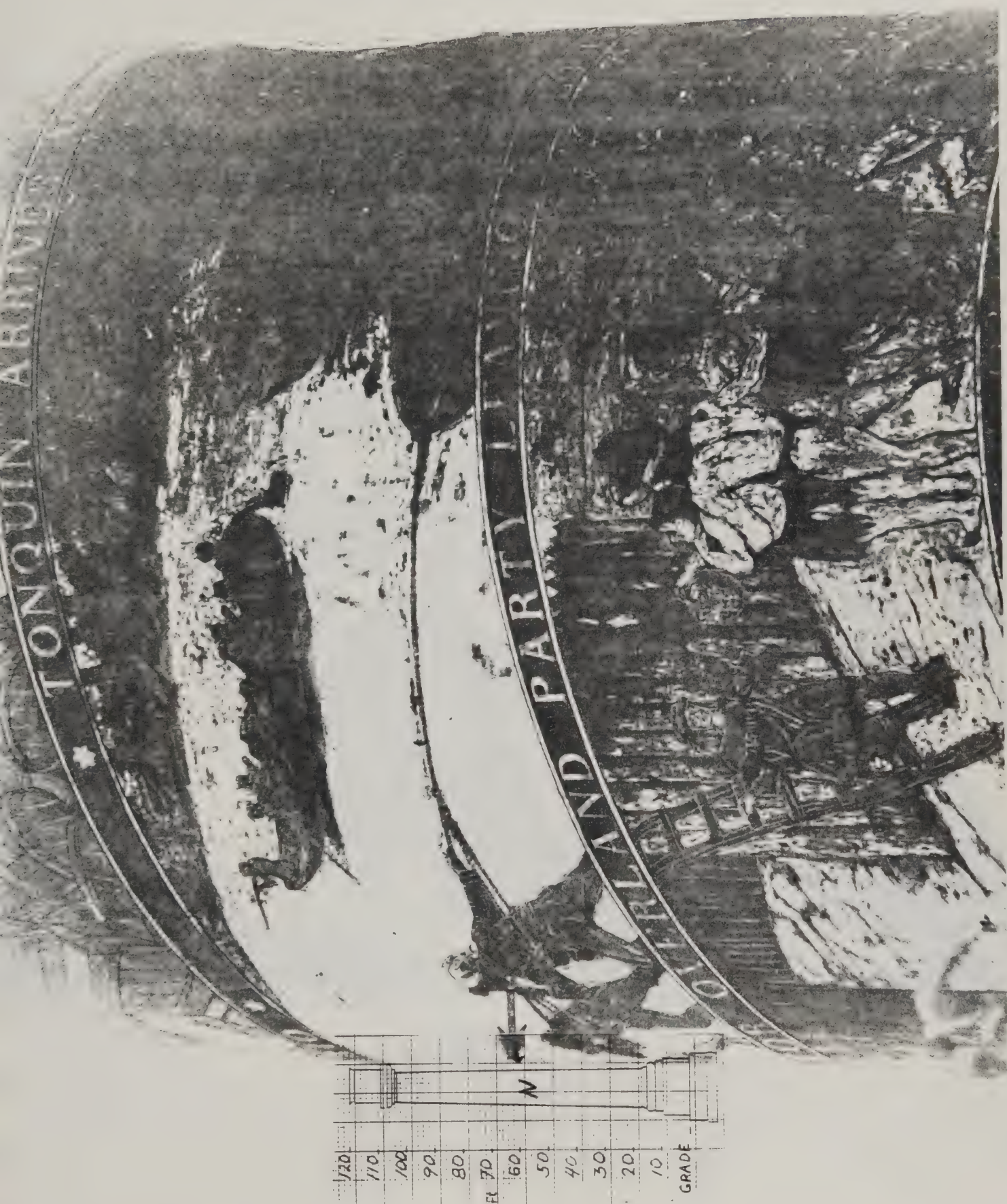


Fig. 32 Photo Astoria Column North Face Section-OCT 1989

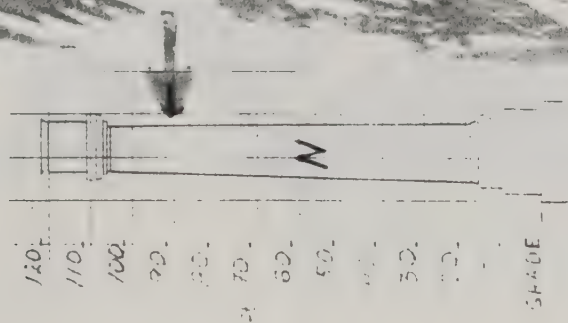


Fig. 33 Photo Astoria Column North Face Section-OCT 1989

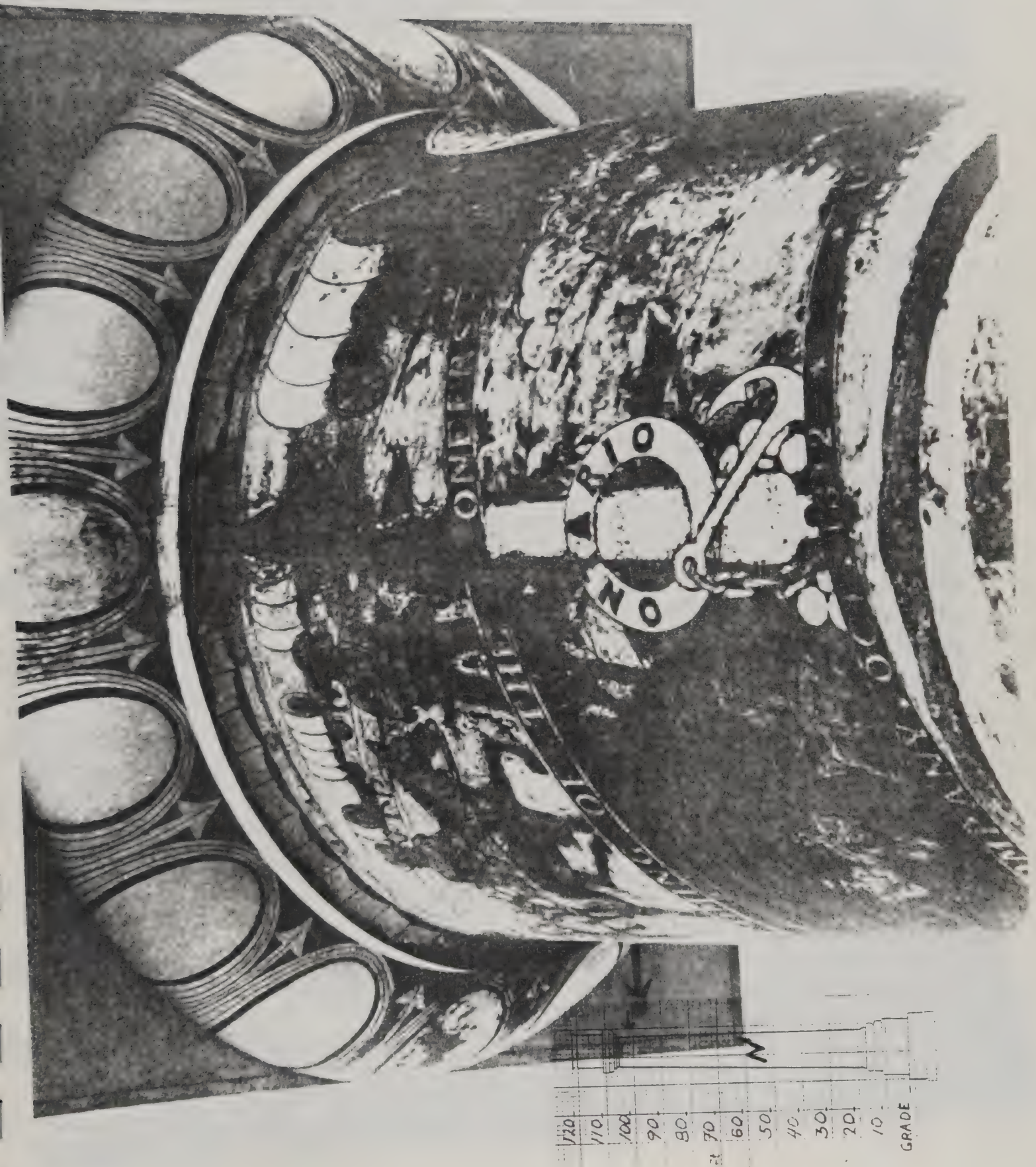


Fig. 34 Photo Astoria Column West Face Section-JAN 1989



Fig. 35 Photo Astoria Column West Face Section--JAN 1989

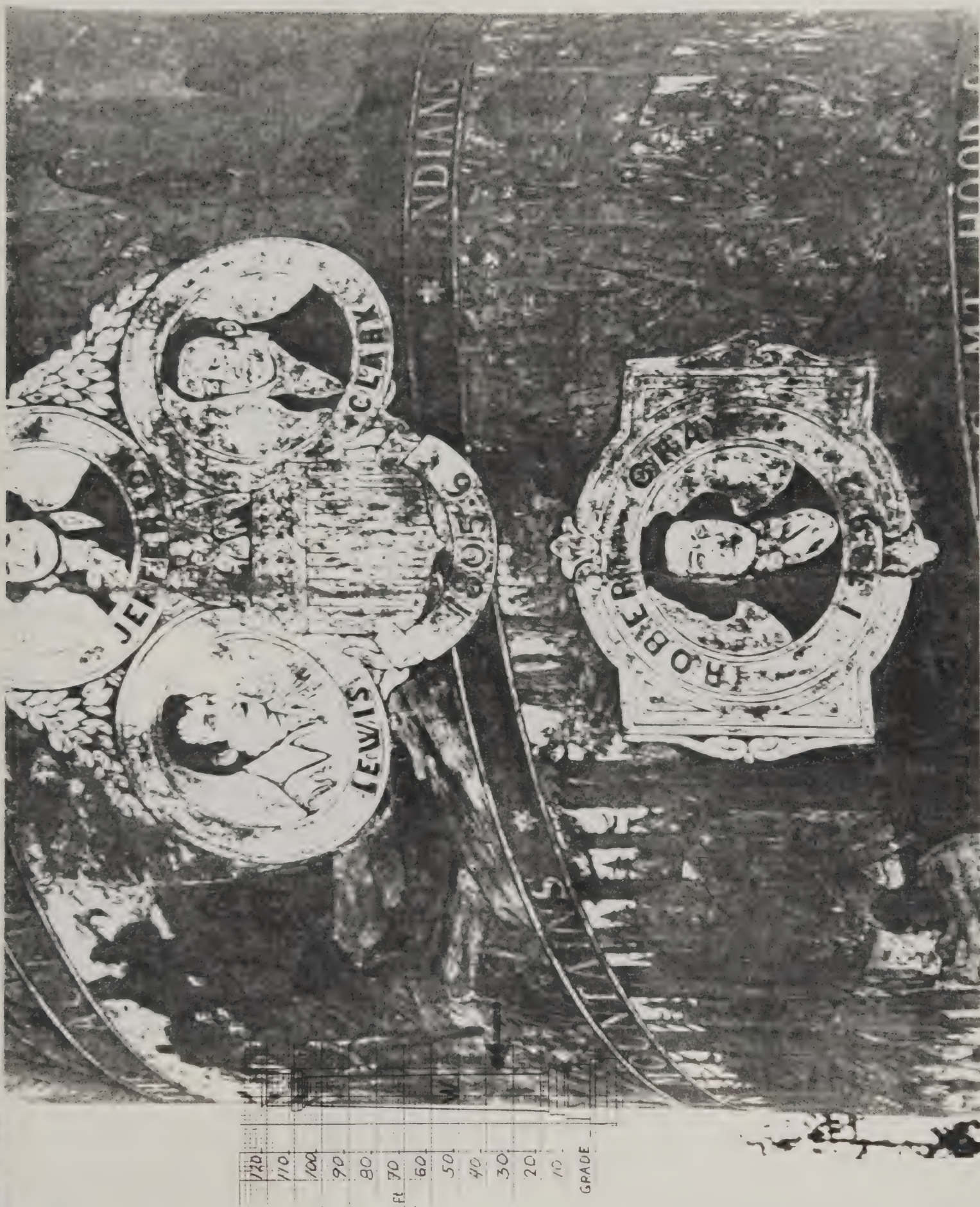


Fig. 37 Photo Astoria Column West Face Section-JAN 1989

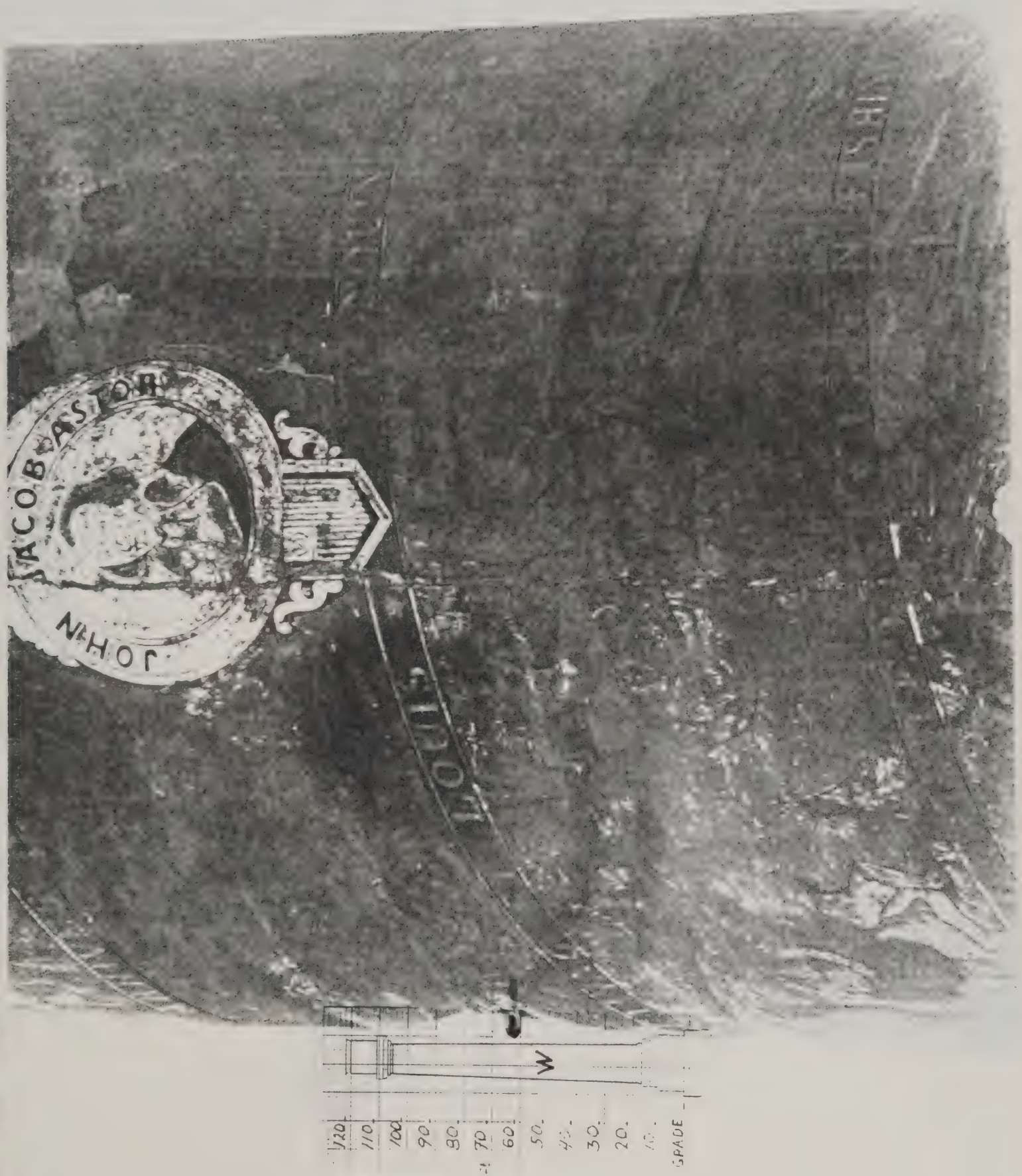


Fig. 38 Photo Astoria Column West Face Section-JAN 1989



Fig. 39 Photo Astoria Column West Face Section-JAN 1989

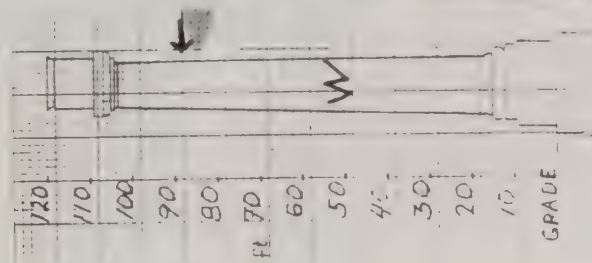
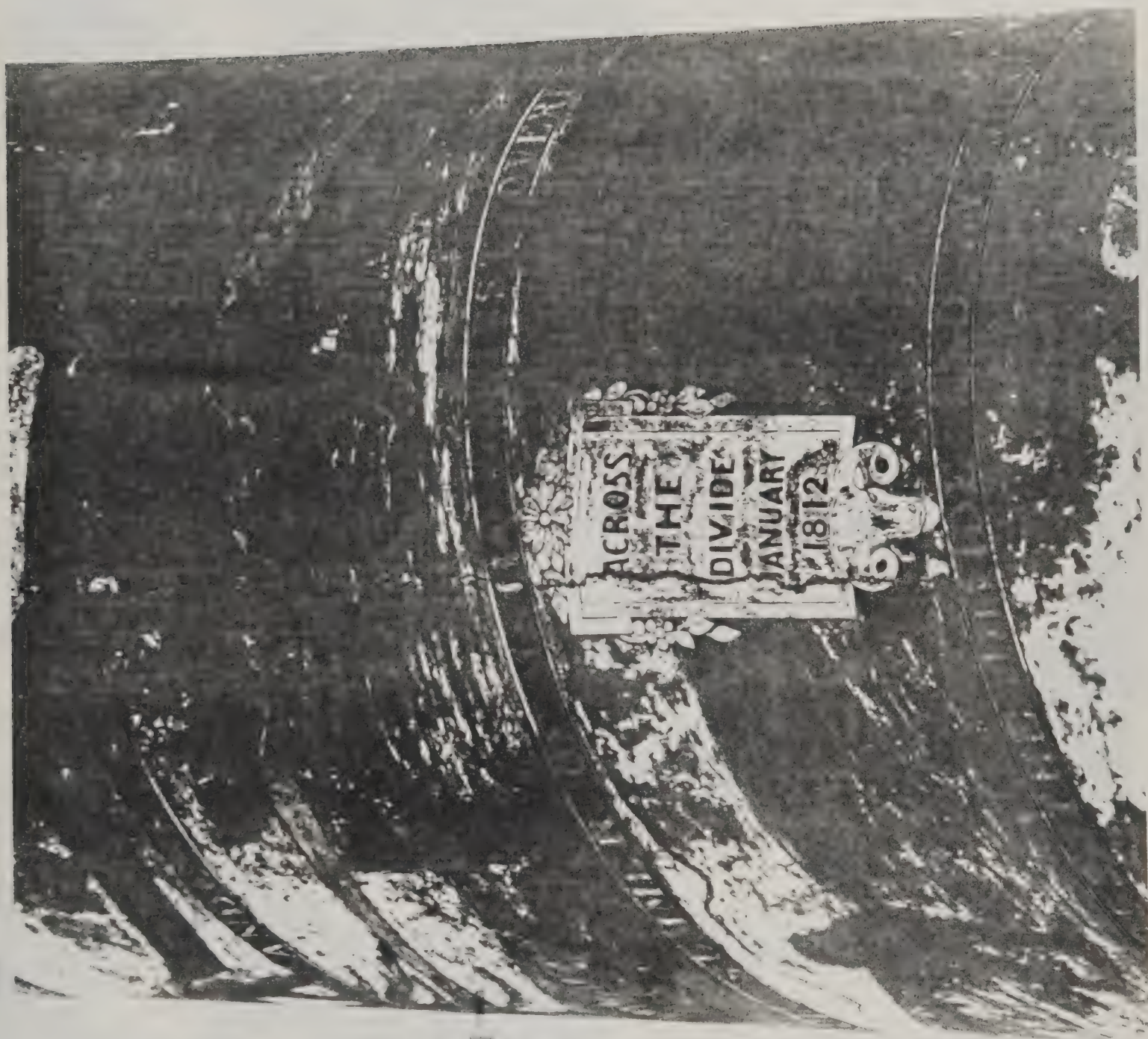


Fig. 40 Photo Astoria Column West Face Section-JAN 1989

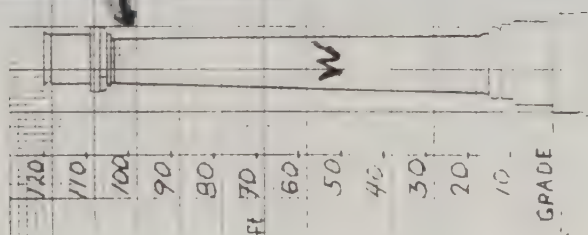
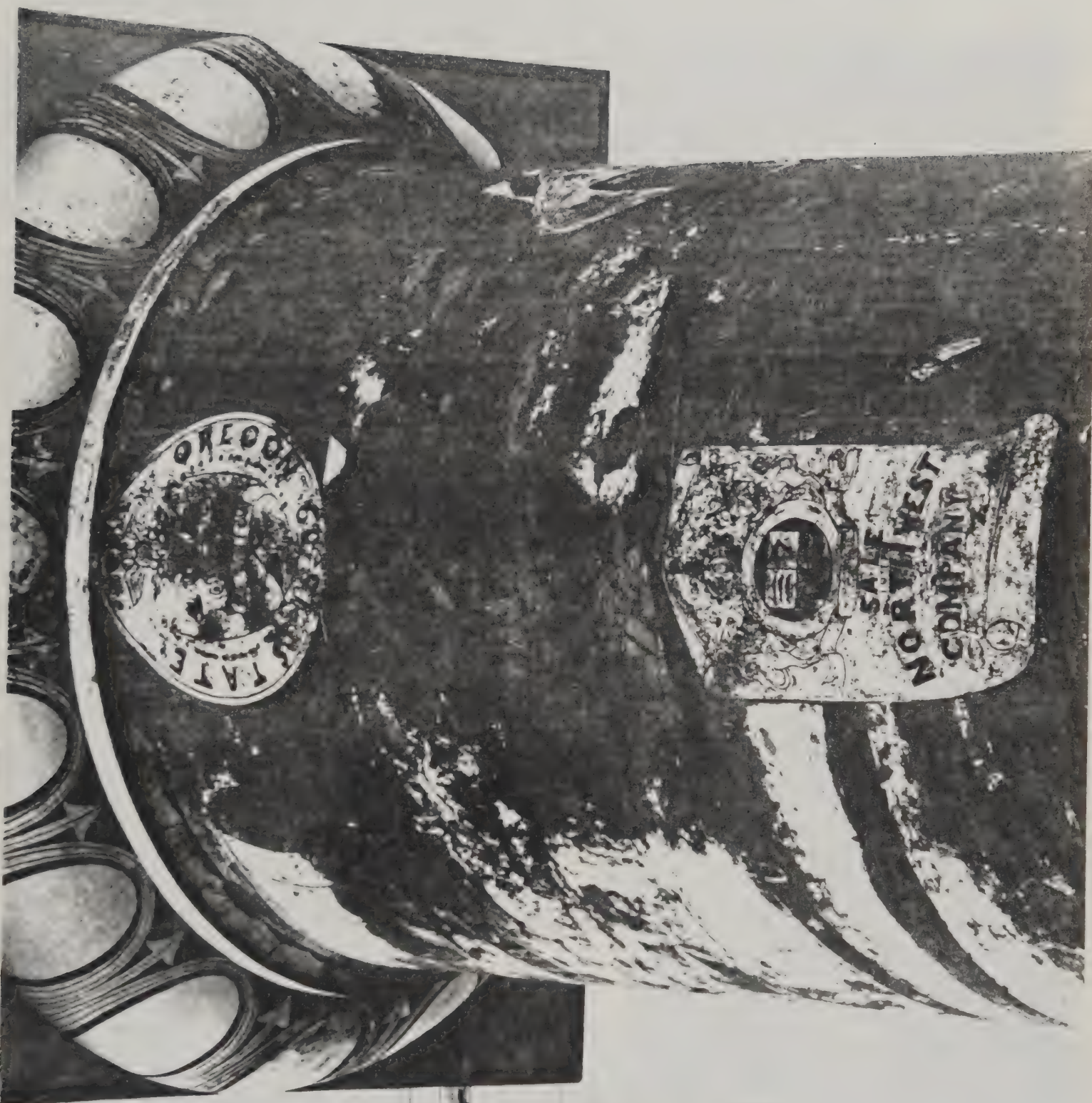


Fig. 41 Photo Astoria Column South Face Section-OCT 1989

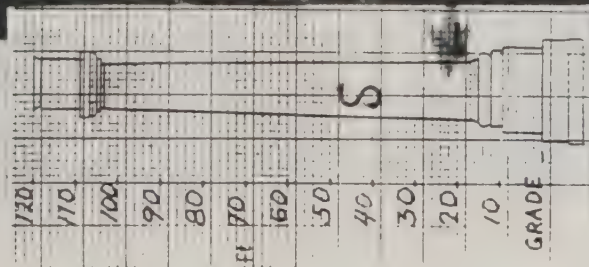


Fig. 42 Photo Astoria Column South Face Section-OCT 1989



Fig. 43 Photo Astoria Column South Face Section-OCT 1989

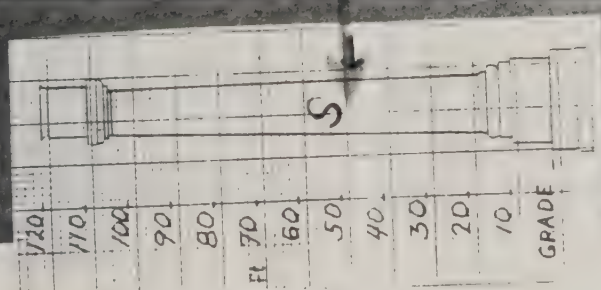
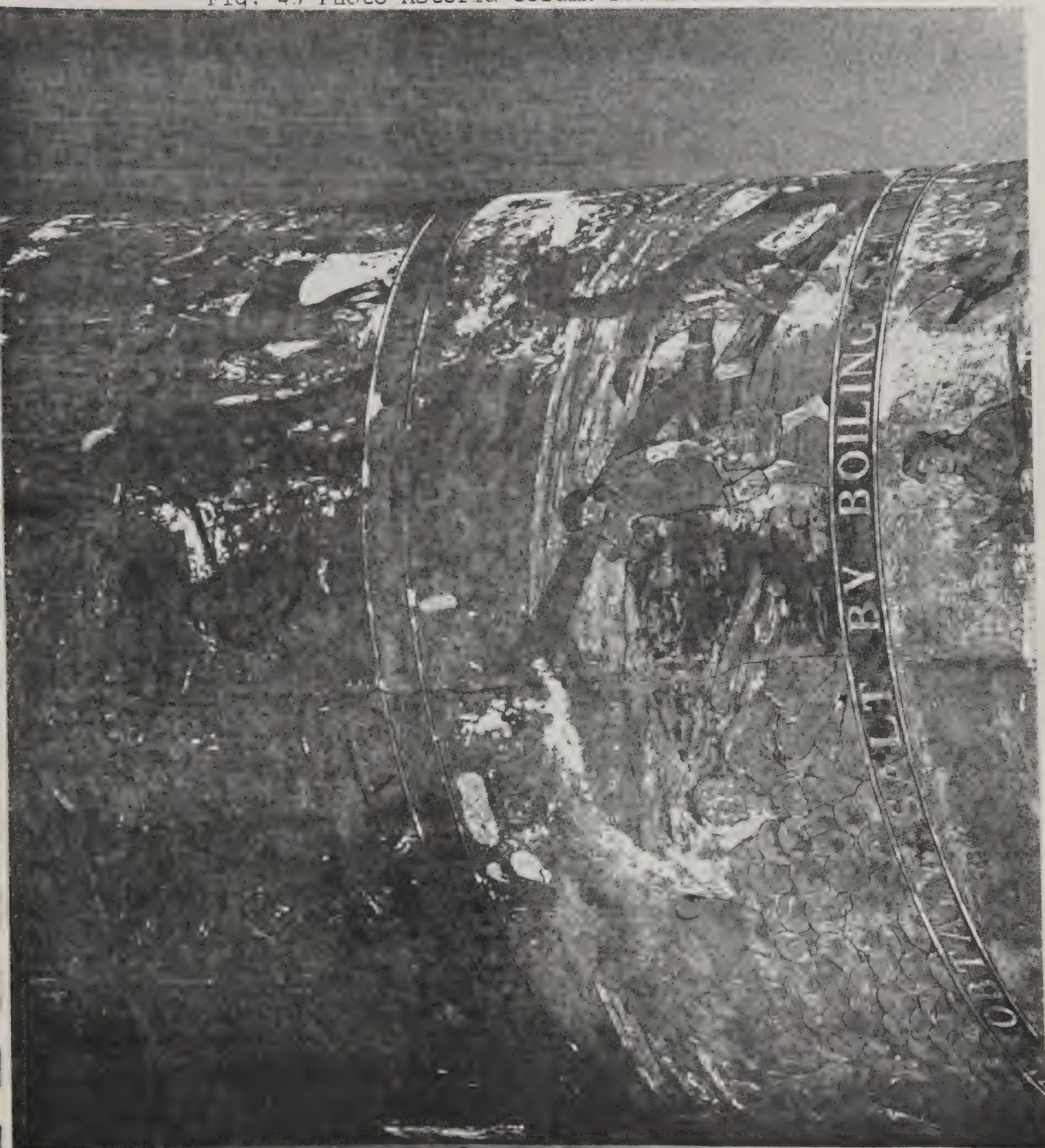


Fig 44 Photo Astoria Column South Face Section-OCT 1989

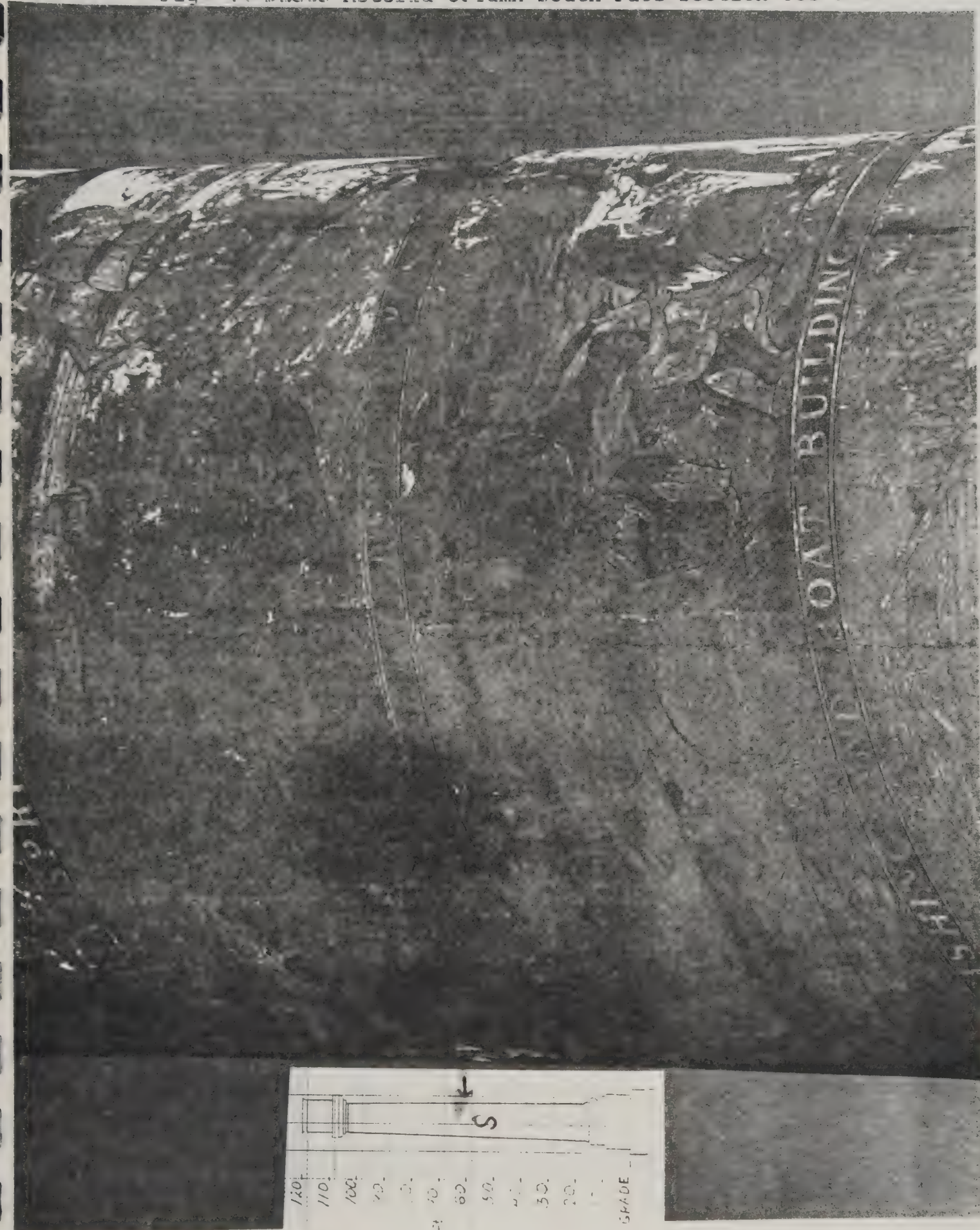


Fig. 45 Photo Astoria Column South Face Section-OCT 1989

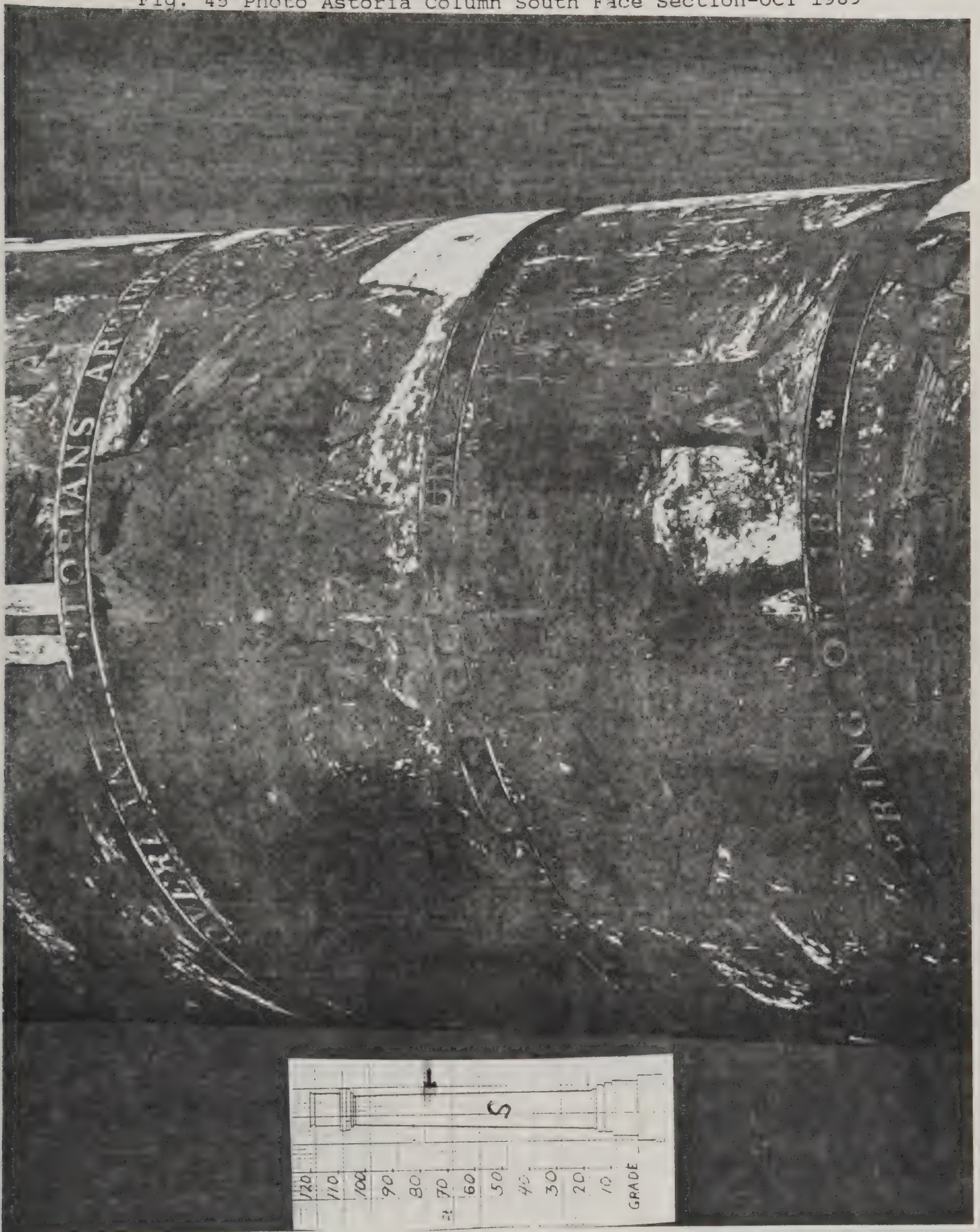


Fig. 46 Photo Astoria Column South Face Section-OCT 1989

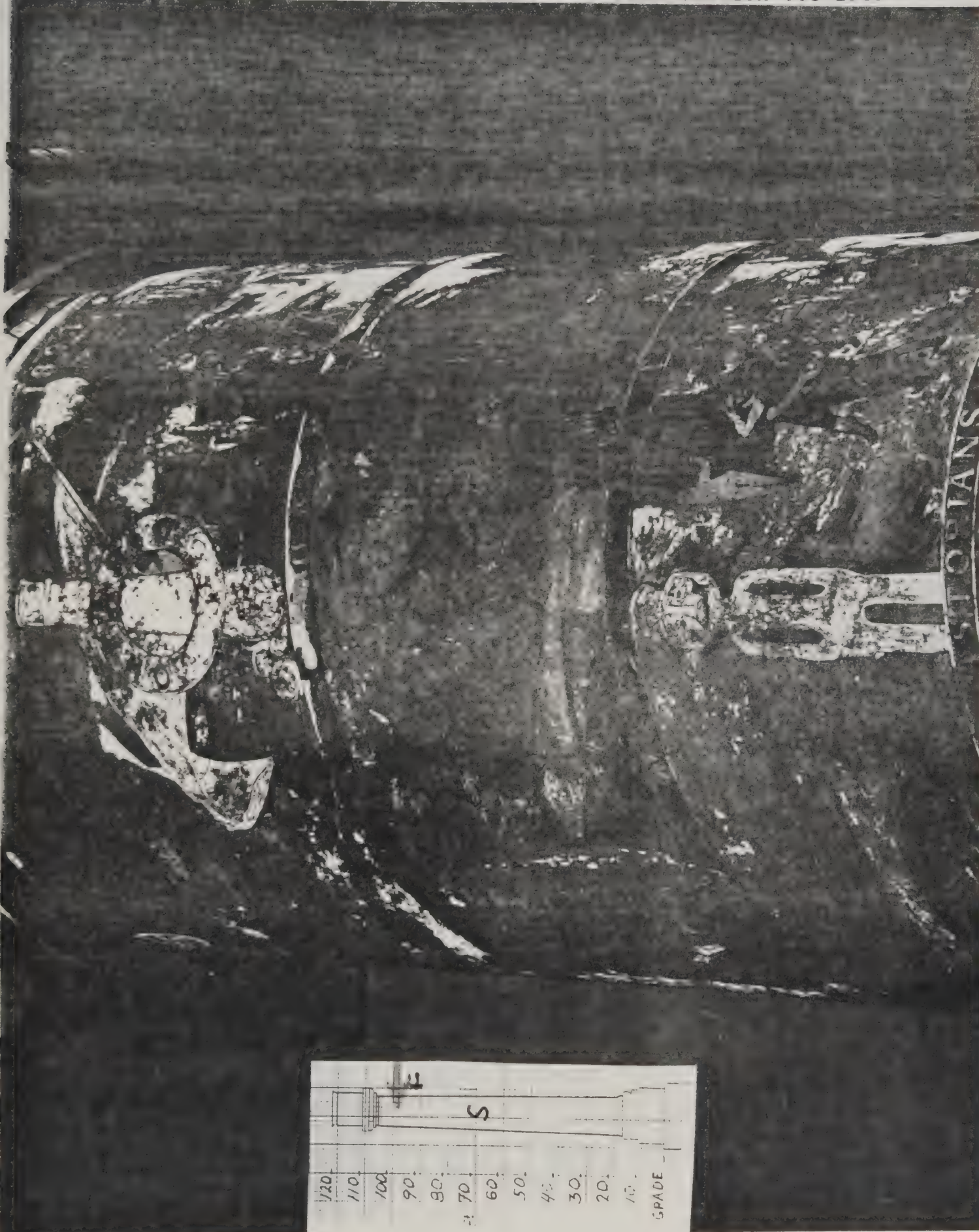


Fig. 47 Photo Astoria Column South Face Section-OCT 1989

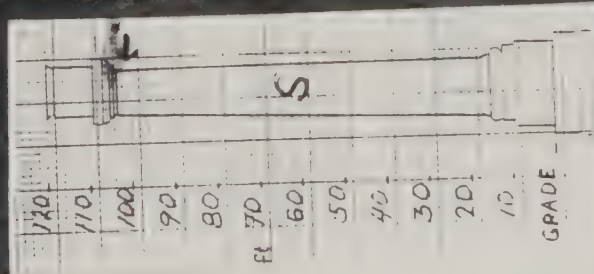
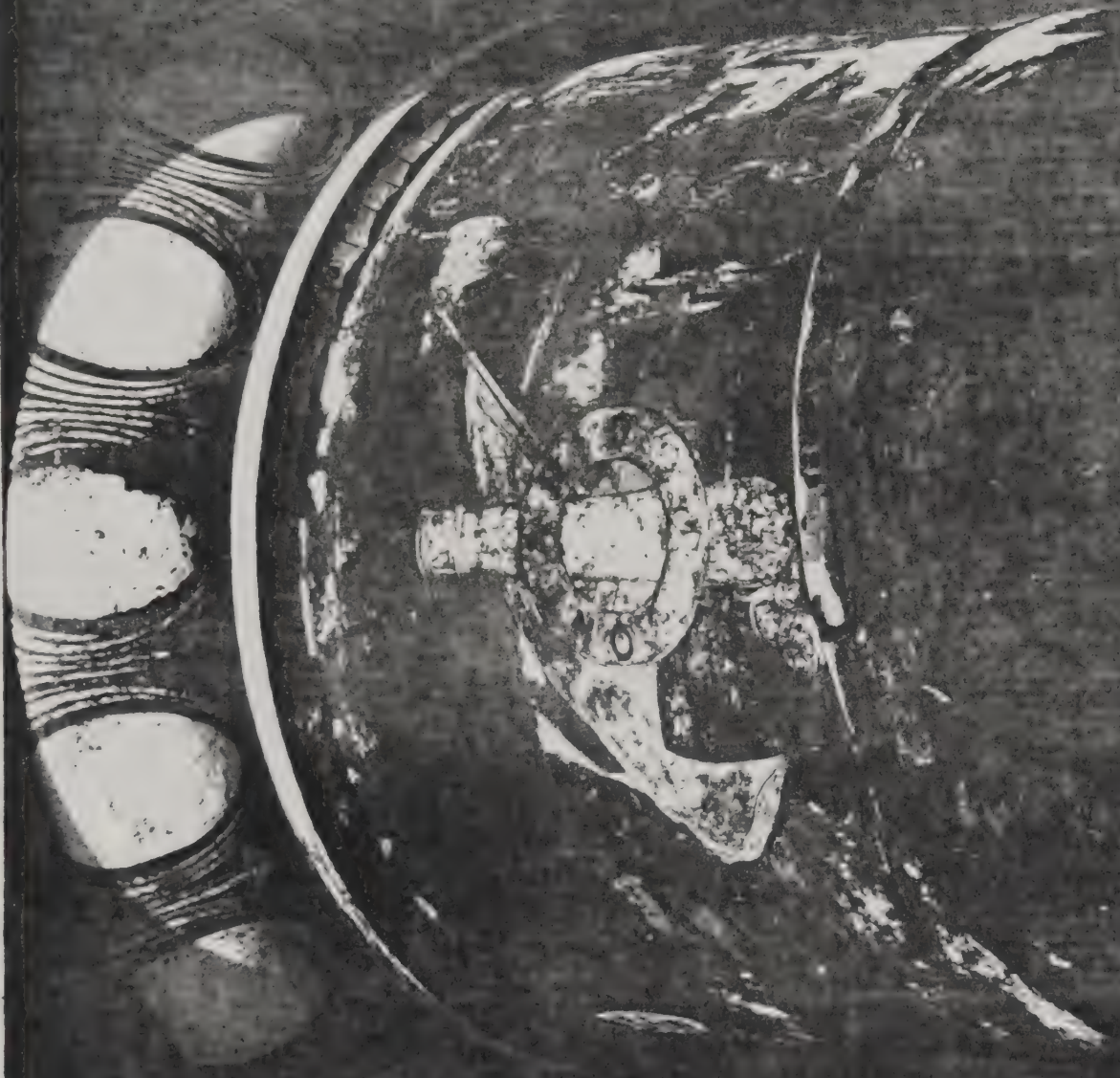


Fig. 48 Photo Astoria Column East Face Section-OCT1989

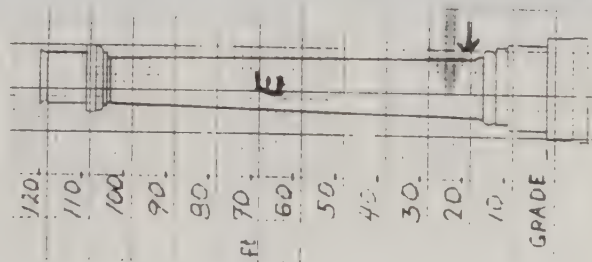


Fig. 49 Photo Astoria Column East Face Section-OCT 1989

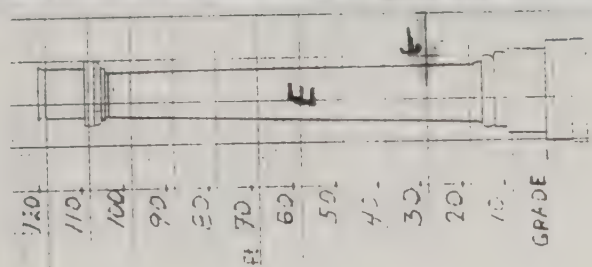


Fig. 50 Photo Astoria Column East Face Section OCT 1989

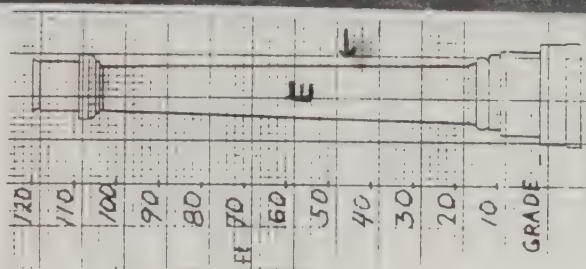


Fig. 51 Photo Astoria Column East Face Section OCT 1989

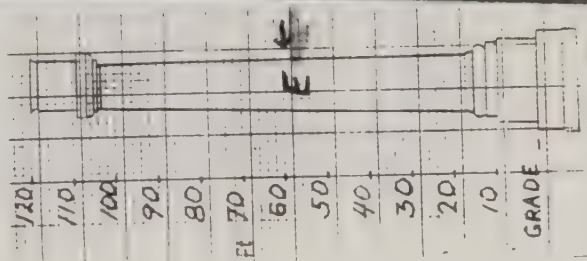
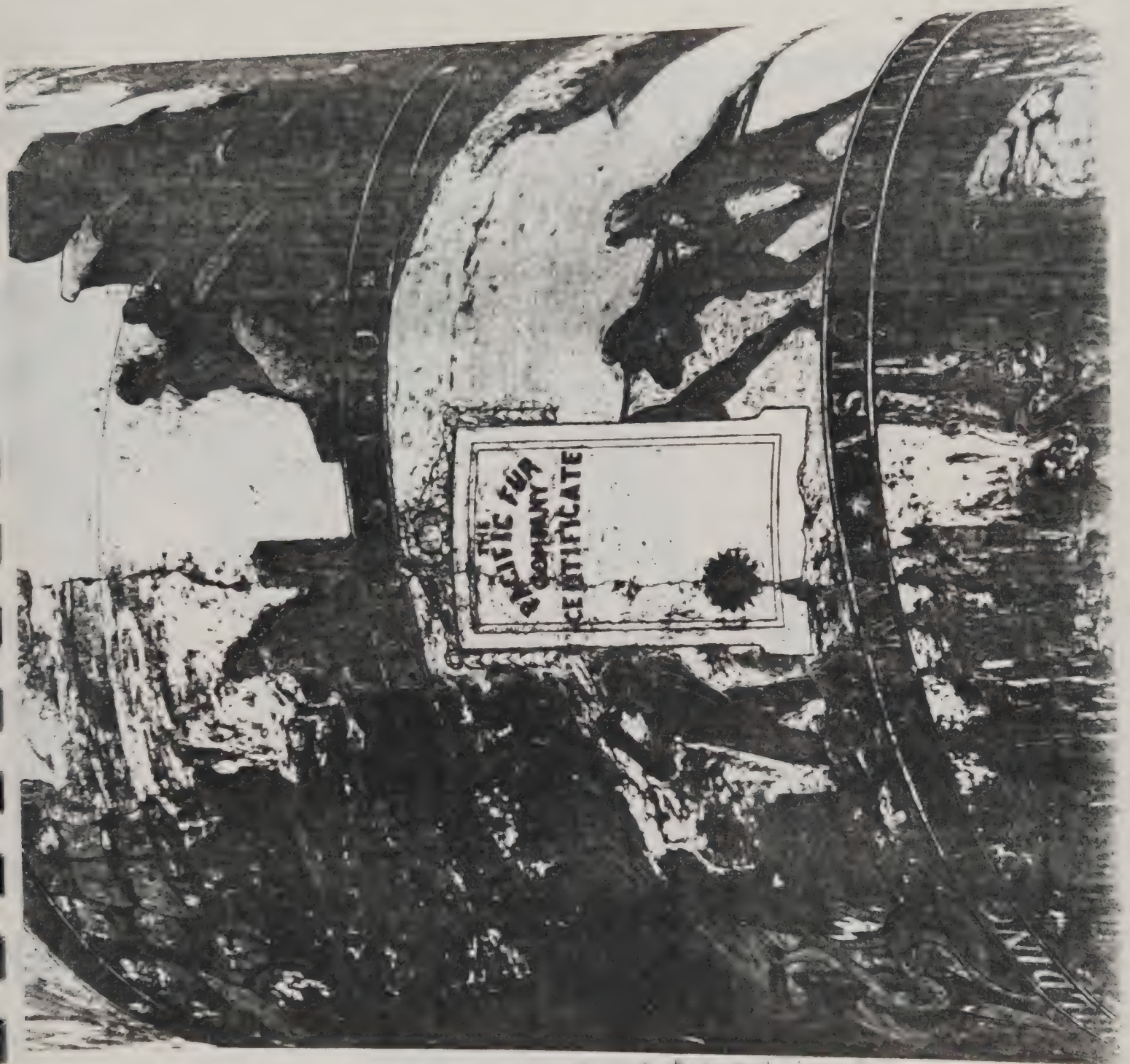


Fig. 52 Photo Astoria Column East Face Section OCT 1989

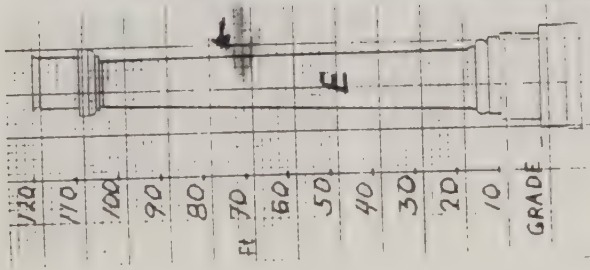
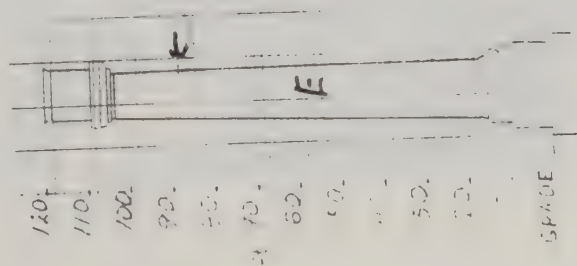


Fig. 53 Photo Astoria Column East Face Section OCT 1989



A high-contrast, black and white photograph of a large, curved, metallic structure, possibly a ship's hull or a large pipe, with a textured, corrugated surface. The structure is illuminated from the side, creating strong highlights and deep shadows. The background is dark and indistinct.

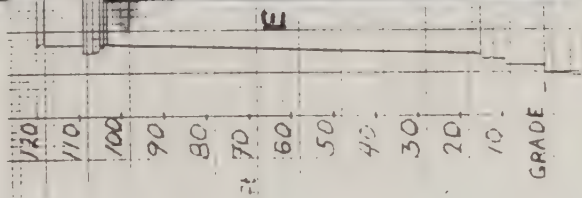




Fig. 55 Photo Astoria Column Detail Before Moldicide Treatment.

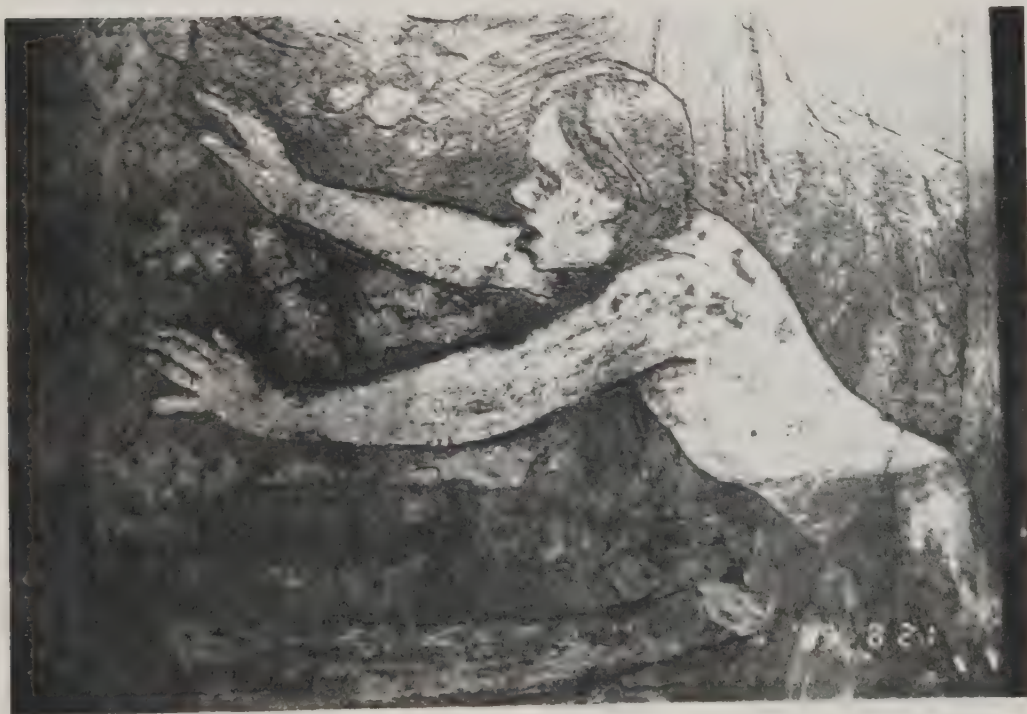


Fig. 56 Photo Astoria Column Detail After Moldicide And Oil Removal.

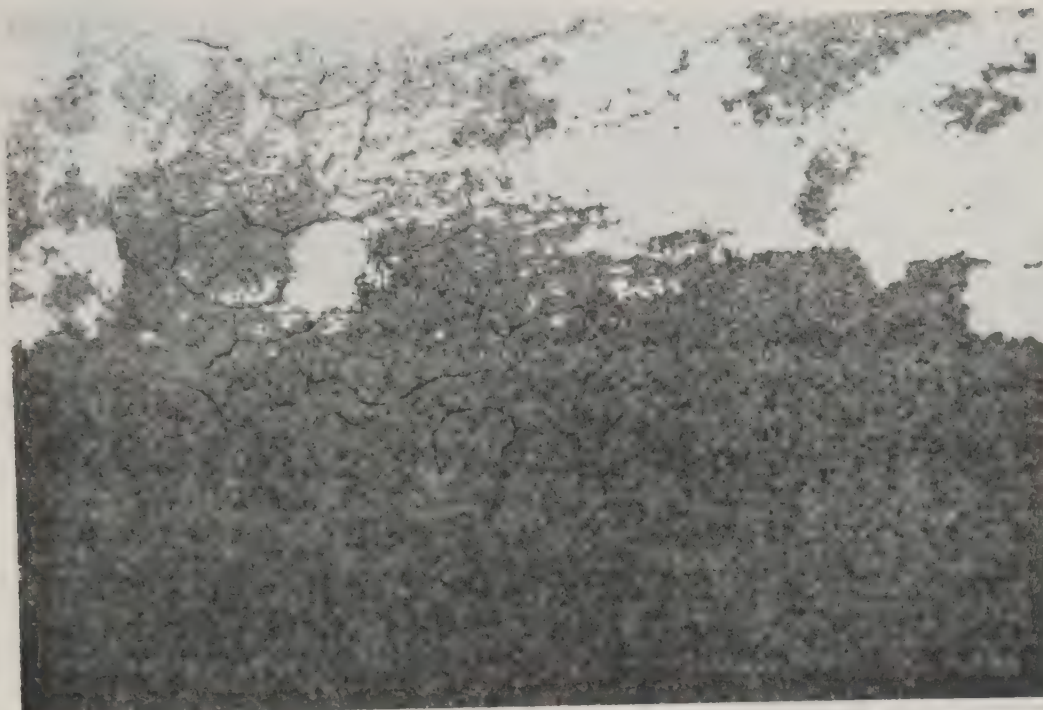


Fig. 57 Photo Astoria Column Detail Shrinkage Cracks In Brown Layer-AUG 1989

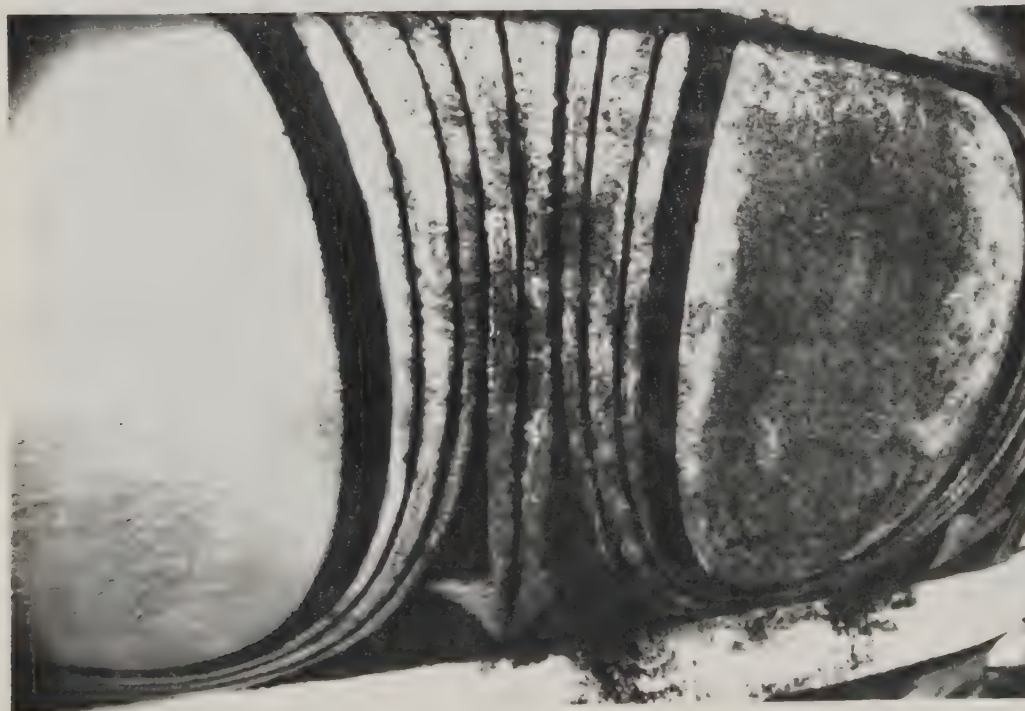


Fig. 58 Photo Astoria Column Detail Egg and Dart Cornice Drip Line Damage Before Cleaning-JUL 1989

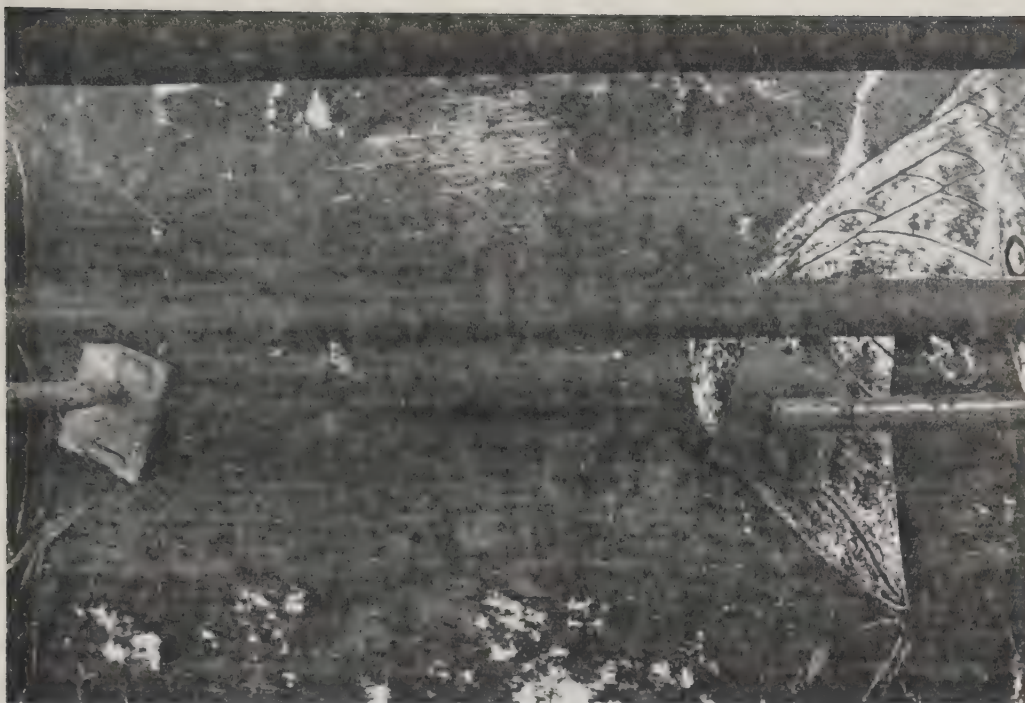


Fig 59 Photo Astoria Column Detail Brown Layer Eroded-AUG 1989



Fig. 60 Photo Astoria Column Detail Sea and Sky Background Lost-AUG 1989

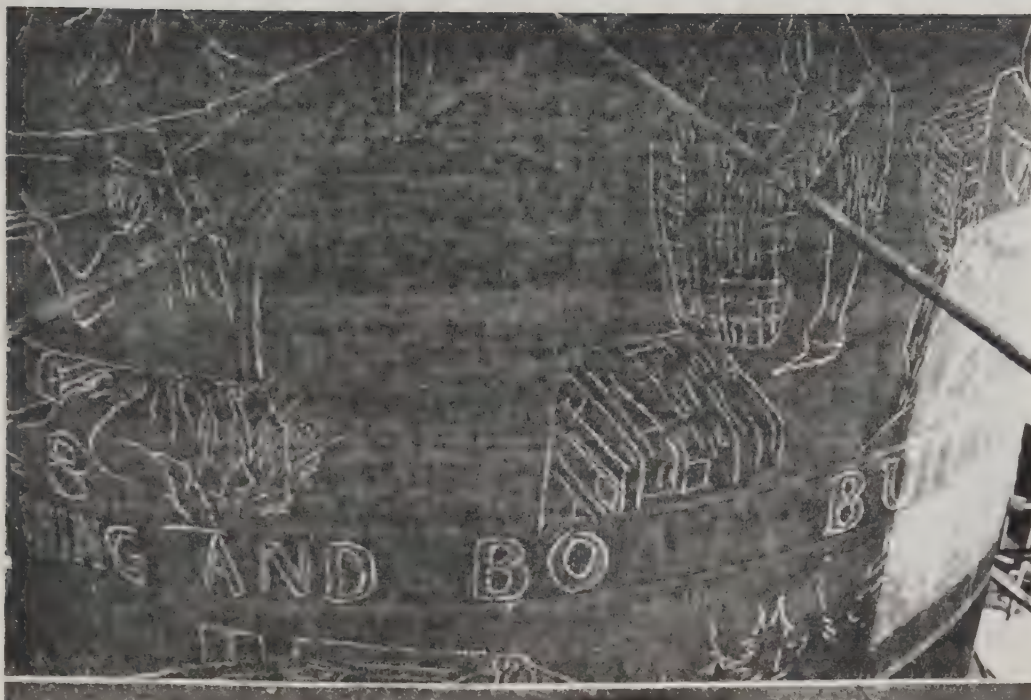


Fig. 61 Photo Astoria Column Detail All Light Colors Lost-AUG 1989



Fig. 62 Photo Astoria Column Detail Carvings Outlined in Chalk-AUG 1989



Fig. 63 Photo Astoria Column Detail Spotty Losses-AUG 1989

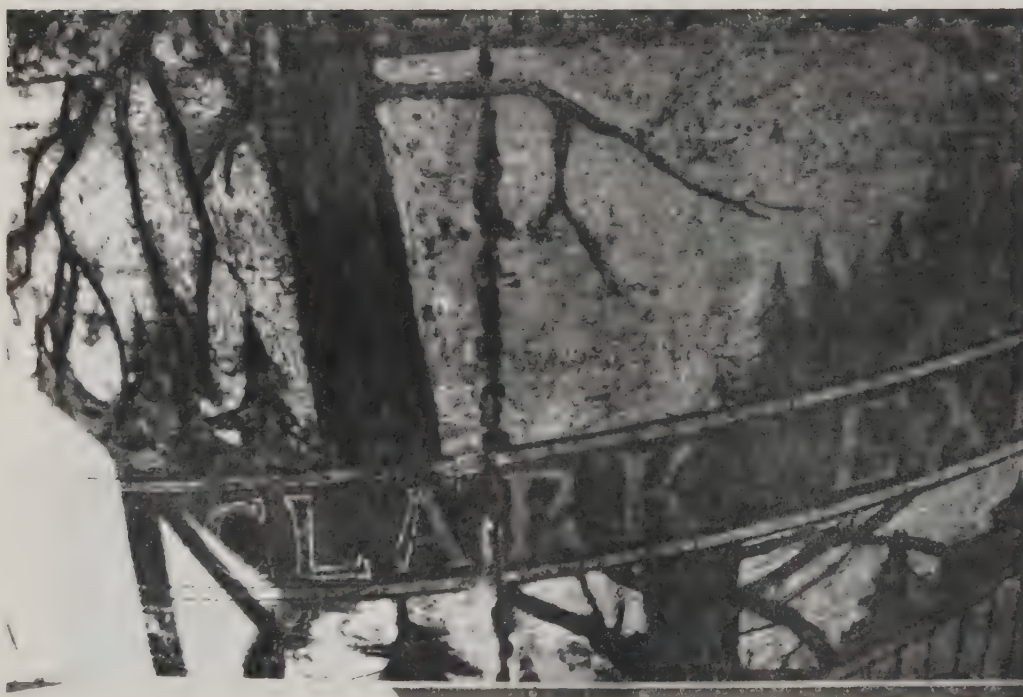


Fig. 64 Photo Astoria Column Detail Lettering Partly Lost-AUG 1989

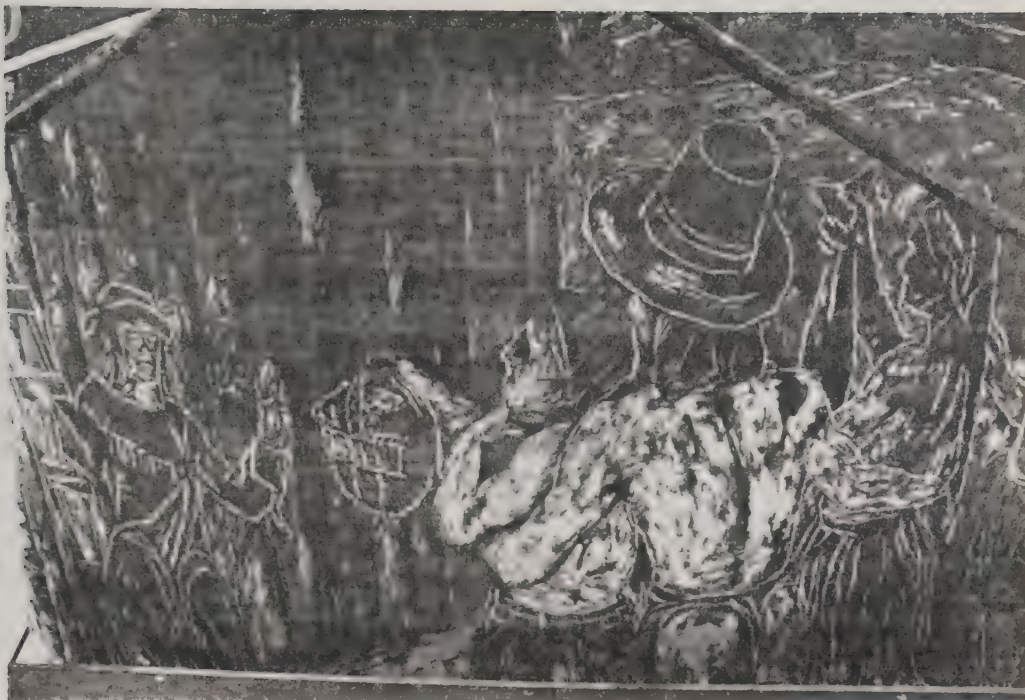


Fig. 65 Photo Astoria Column Detail Spotty Losses-AUG 1989



Fig. 66 Photo Astoria Column Detail Background And Skin Lost-AUG 1989



Fig. 67 Photo Astoria Column Detail Spotty Losses-AUG 1989

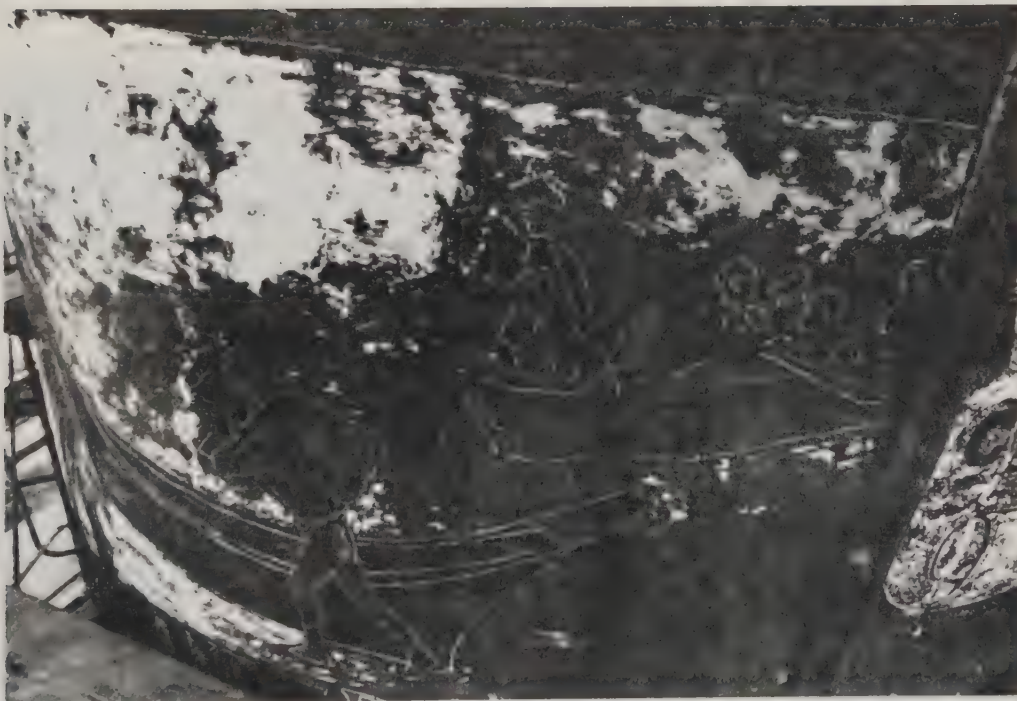


Fig. 68 Photo Astoria Column Detail Sea Background Lost-AUG 1989



Fig. 69 Photo Astoria Column Detail Spotty Losses-AUG 1989



Fig. 70 Photo Astoria Column Detail Medallion "Spotty" Losses-AUG 1989



Fig. 71 Photo Astoria Column Detail "Intact" Sacajawea (Sa-ka-ka-we-a) And Baby Leading Expedition Across The Mountains-AUG 1989

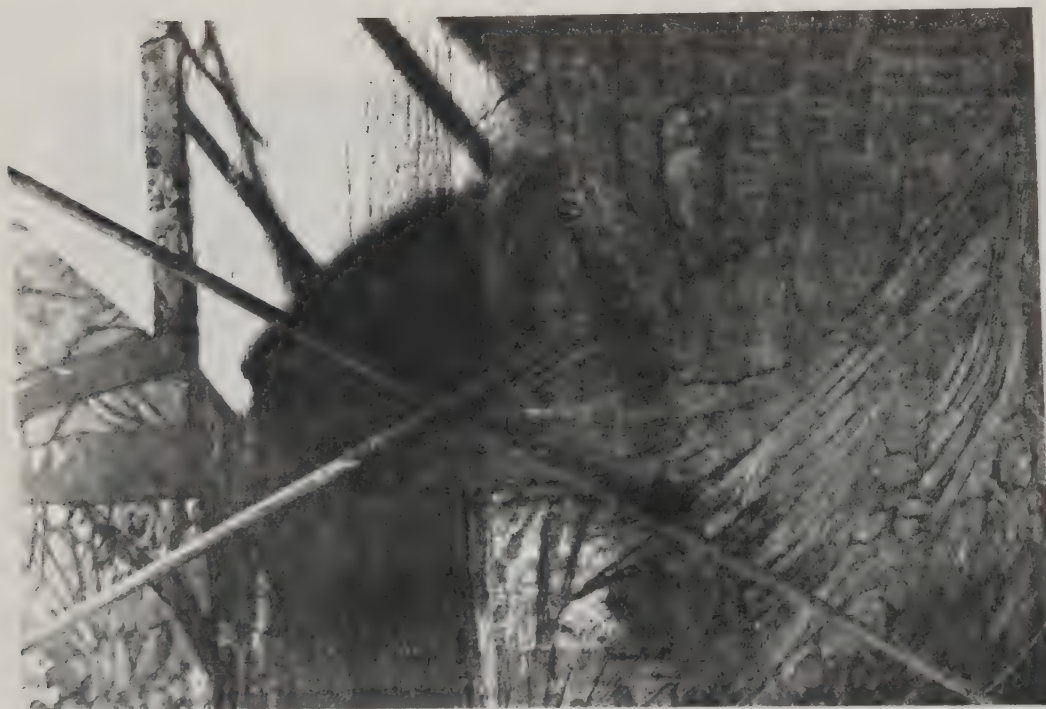


Fig. 72 Photo Astoria Column Detail Tree Bark Texture-AUG 1989



Fig. 73 Photo Astoria Column Detail Intact Design-JUL 1989

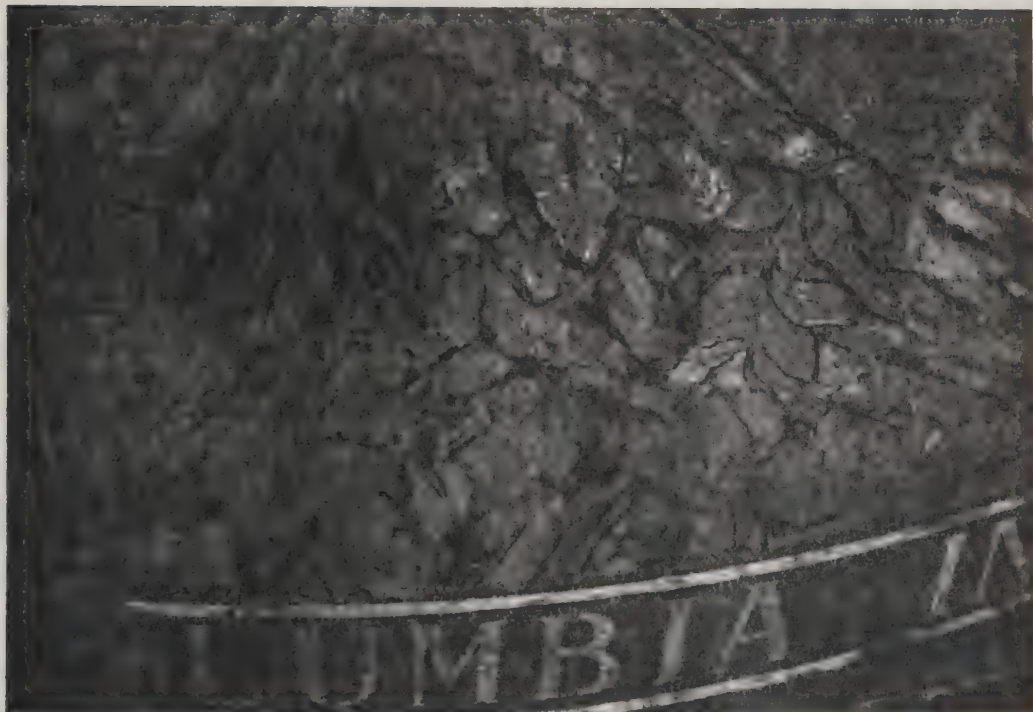


Fig. 74 Photo Astoria Column Detail Forest Leaves-AUG 1989

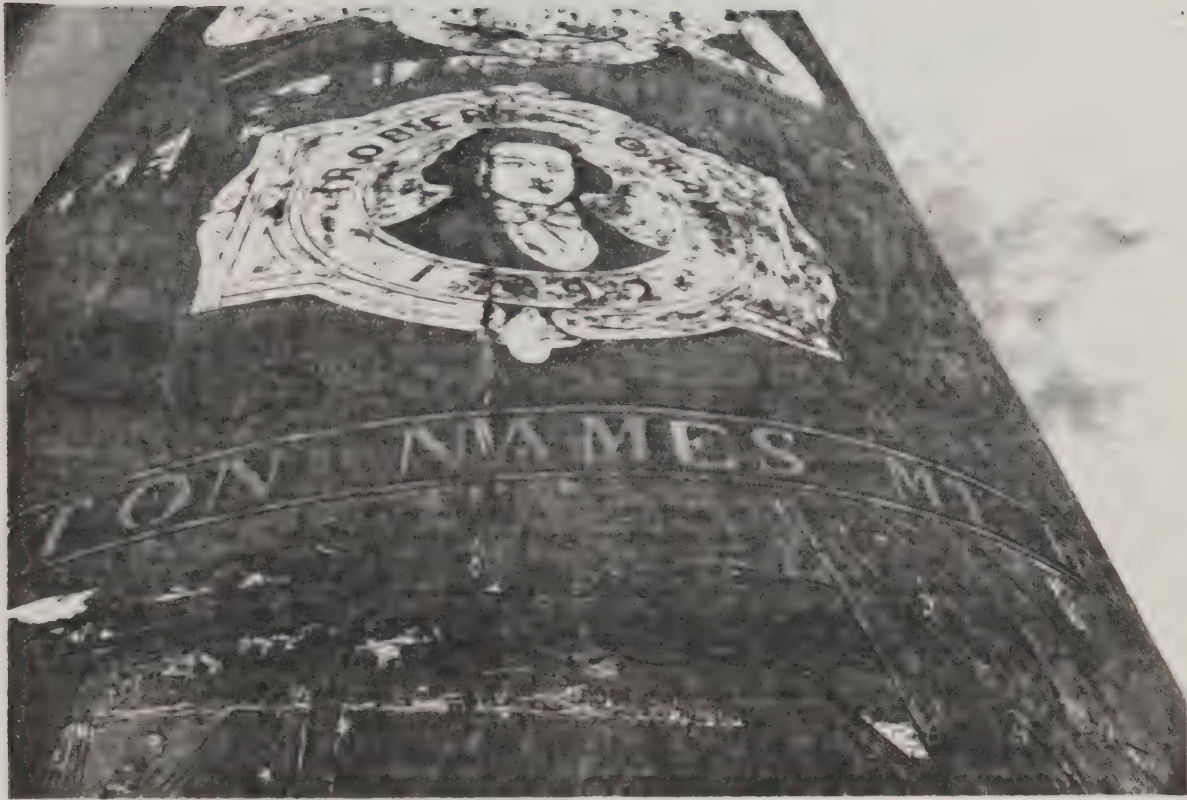


Fig. 75 Photo Astoria Column Detail of Vertical Crack



Fig. 76 Photo Astoria Column Detail Previously Patched Spalls-
JUL 1989

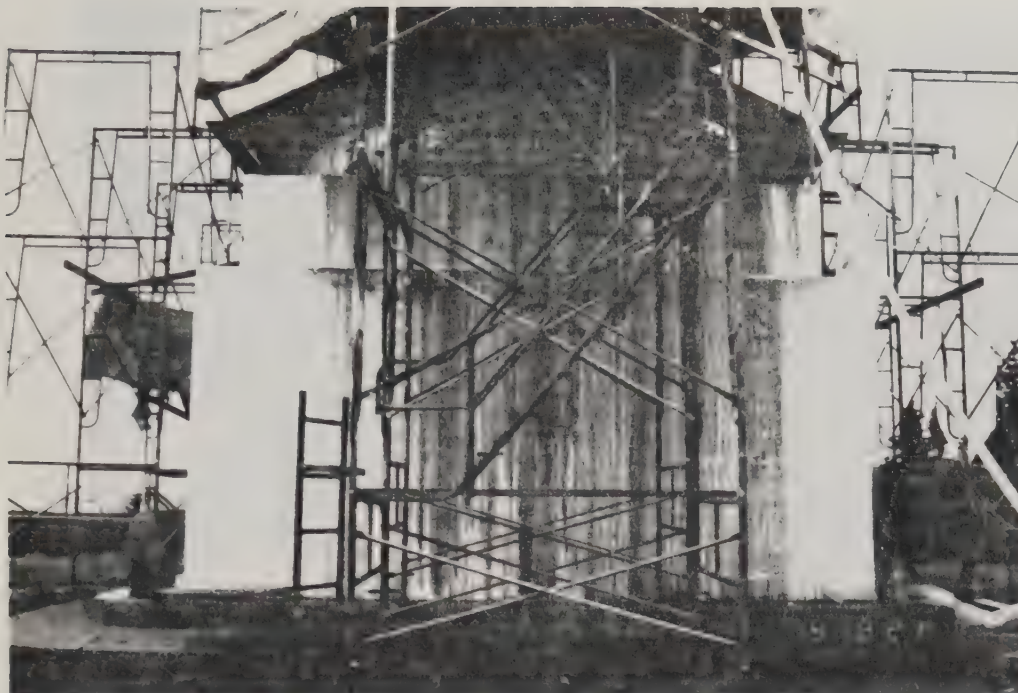


Fig. 77 Photo Astoria Column Detail Residue, Oil Removal-AUG 1989

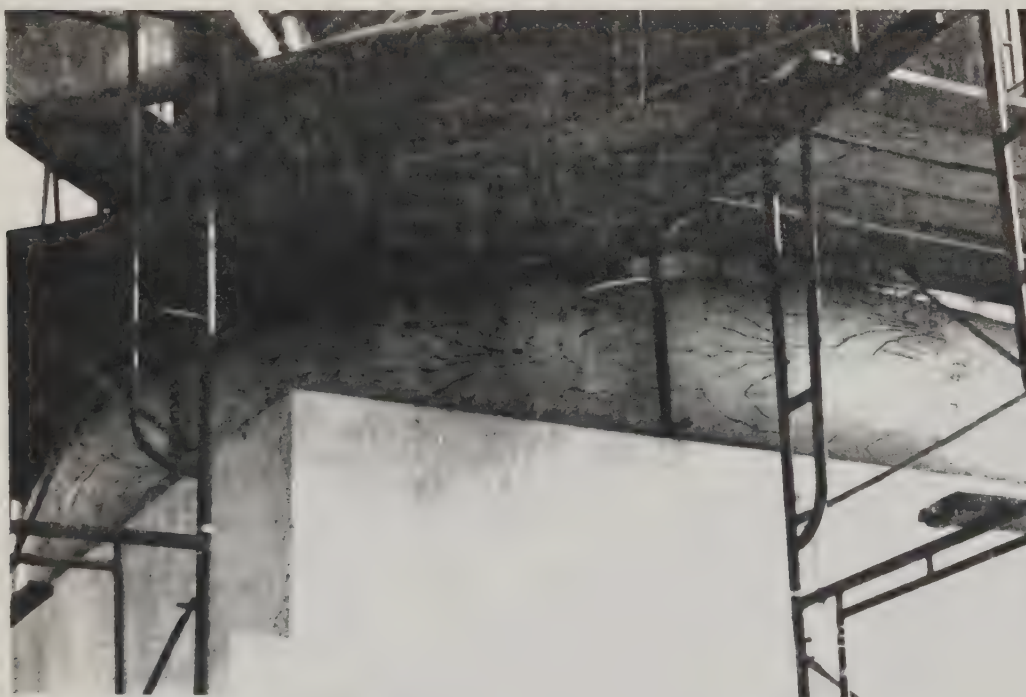


Fig. 78 Photo Astoria Column Detail of Wraith-AUG 1989

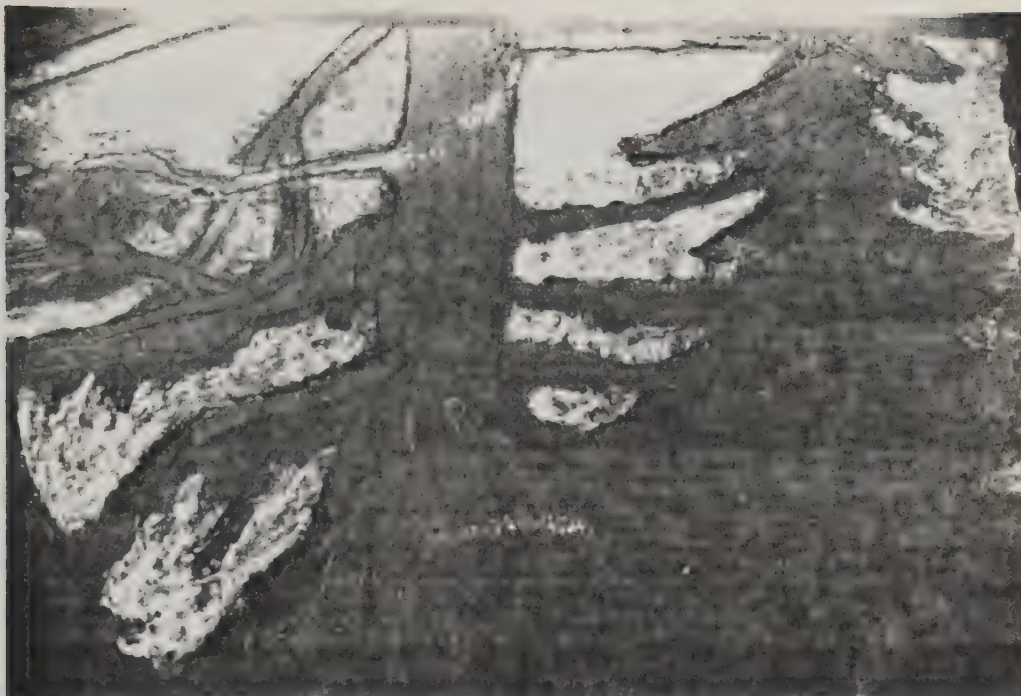


Fig. 79 Photo Astoria Column Detail Carvings Lined in Black-JUL 1989



Fig. 80 Photo Astoria Column Detail Carvings Lined in Black-JUL 1989

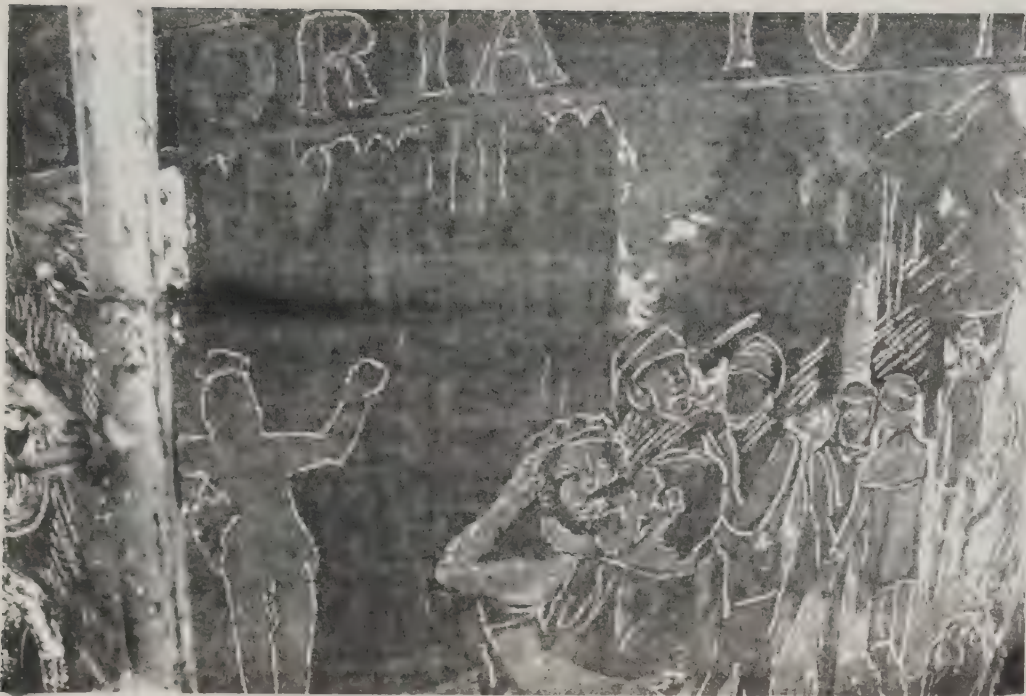


Fig. 81 Astoria Column Detail



Fig. 82 Astoria Column Detail

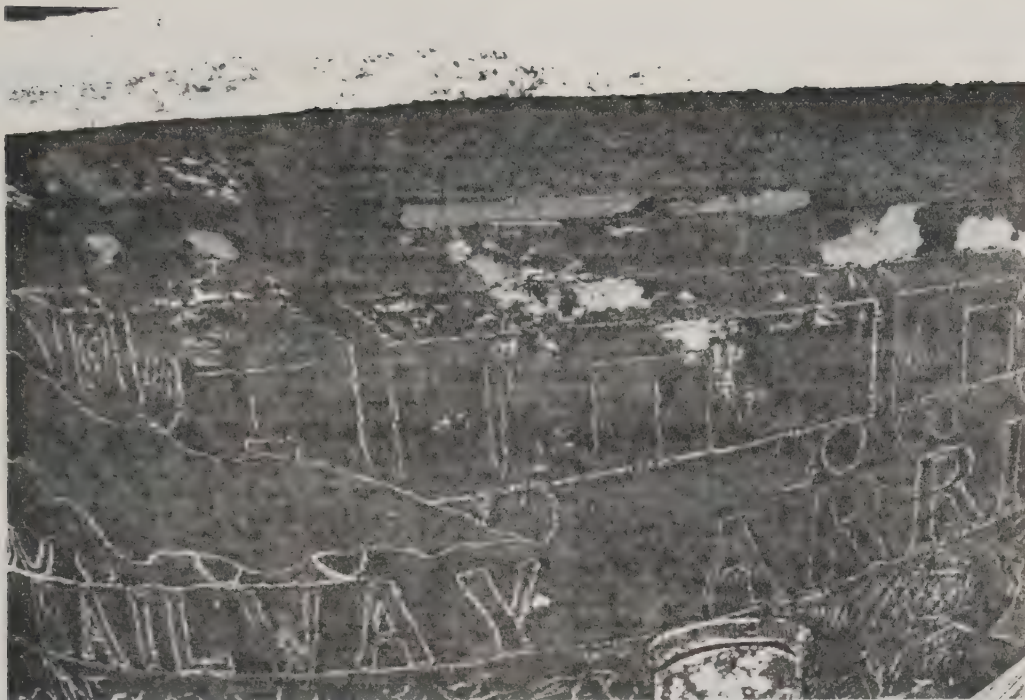


Fig. 83 Photo Astoria Column Detail Railway-AUG 1989



Fig. 84 Astoria Column Detail

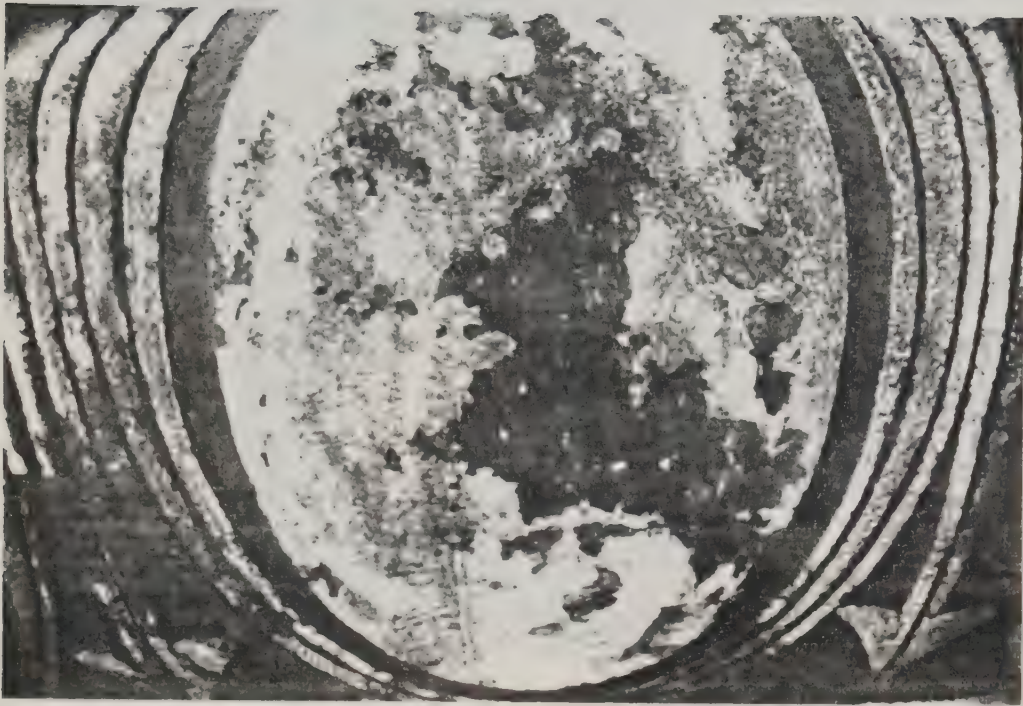


Fig. 85 Astoria Column Detail



Fig. 86 Astoria Column Detail



Fig. 87 Astoria Column Detail



Fig. 88 Astoria Column Detail

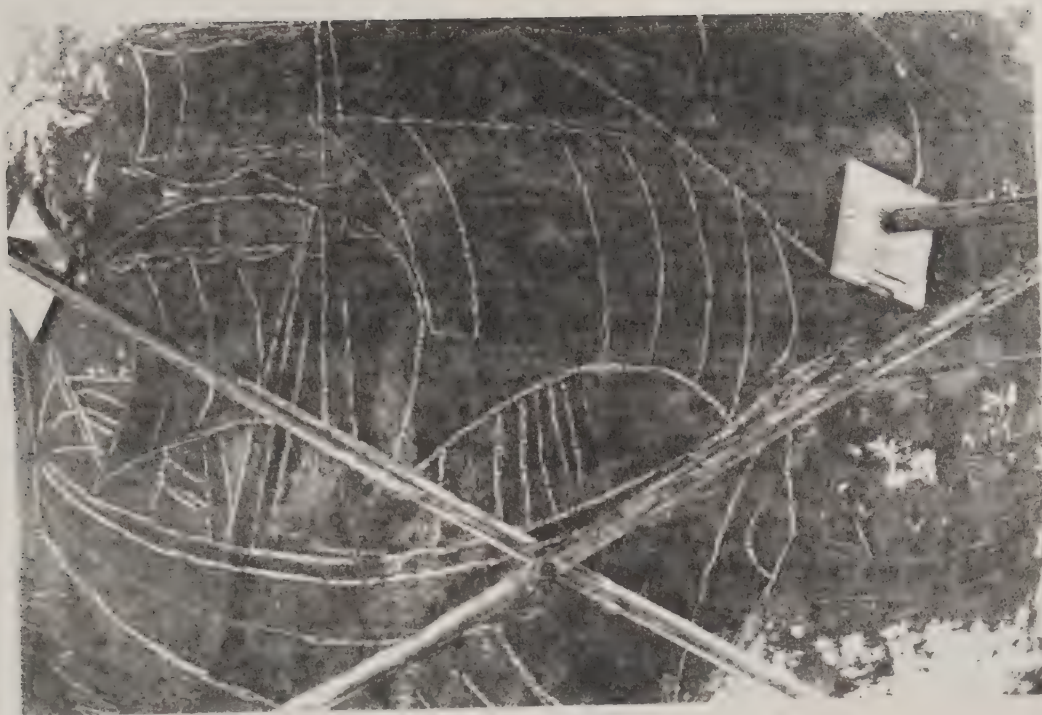


Fig. 89 Astoria Column Detail

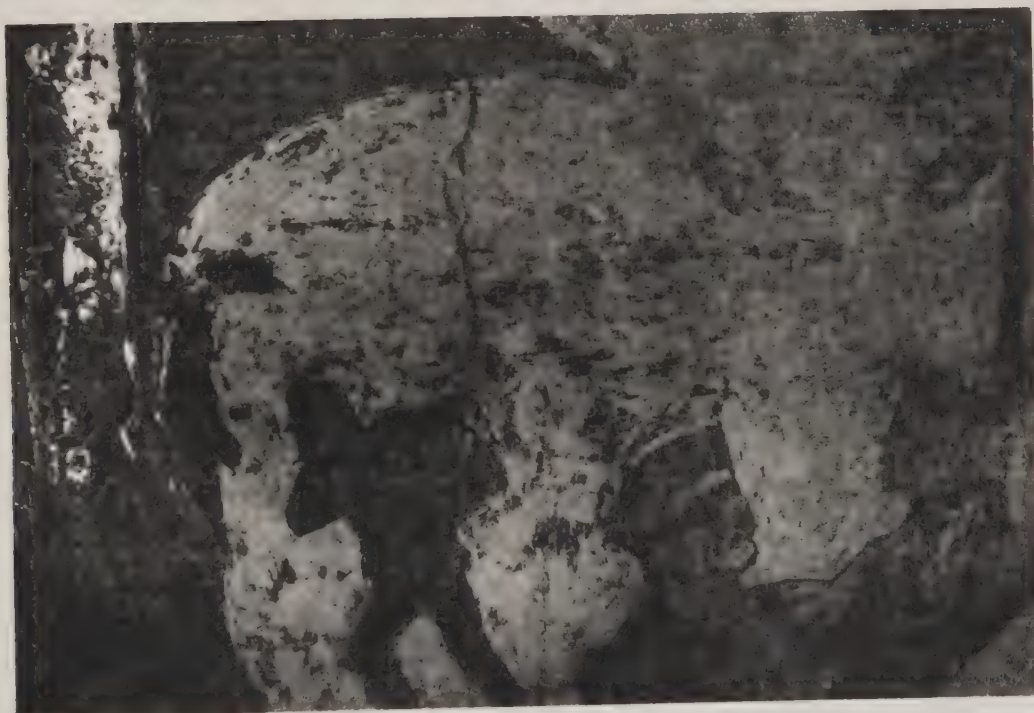


Fig. 90 Astoria Column Detail

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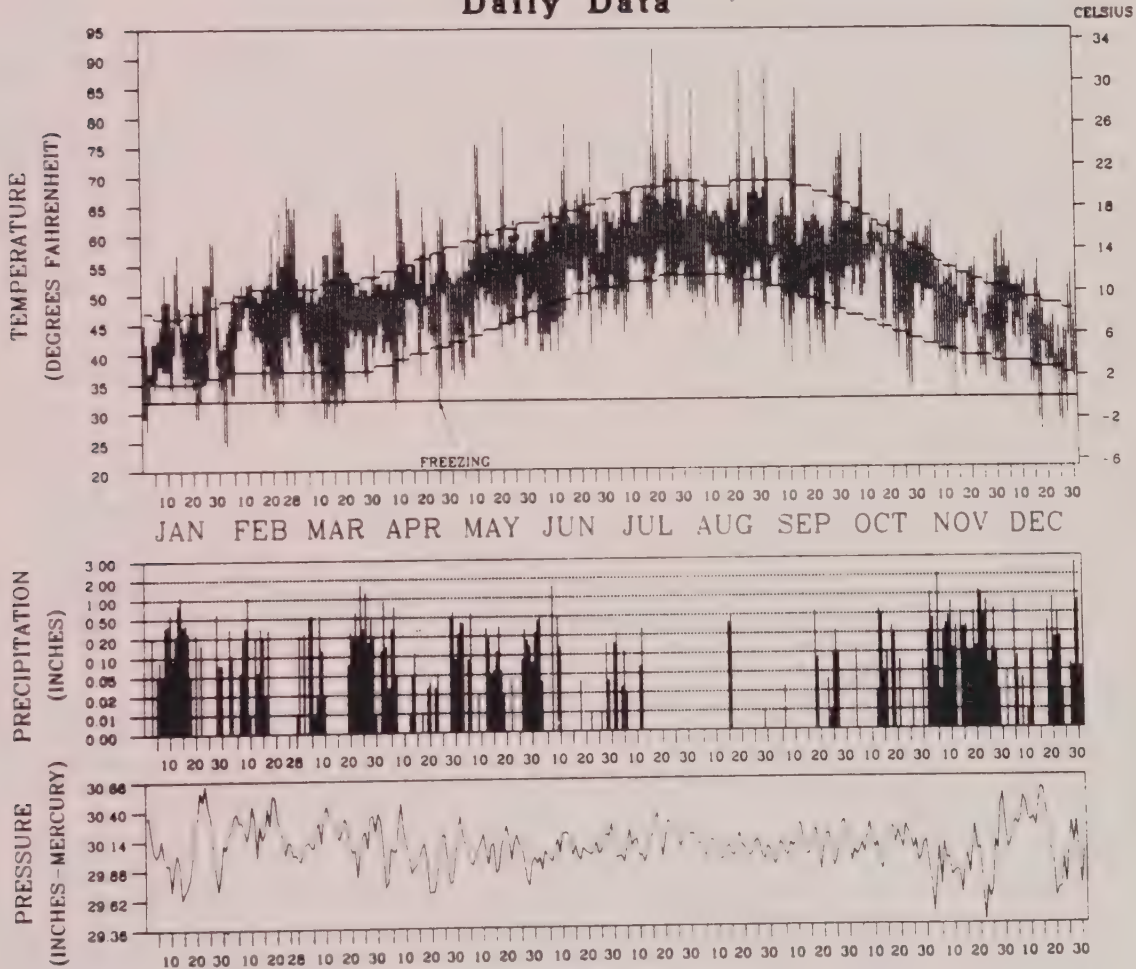
1988 LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

ASTORIA, OREGON



Daily Data



TEMPERATURE DEPICTS NORMAL MAXIMUM, NORMAL MINIMUM AND ACTUAL DAILY HIGH AND LOW VALUES (FAHRENHEIT)
PRECIPITATION IS MEASURED IN INCHES. SCALE IS NON-LINEAR
STATION PRESSURE IS MEASURED IN INCHES OF MERCURY

I CERTIFY THAT THIS IS AN OFFICIAL PUBLICATION OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, AND IS COMPILED FROM RECORDS ON FILE AT THE NATIONAL CLIMATIC DATA CENTER, ASHEVILLE, NORTH CAROLINA, 28801

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ASHEVILLE NORTH CAROLINA

Kenneth D. Naeve
DIRECTOR
NATIONAL CLIMATIC DATA CENTER

ATTACHMENT I, WEATHER REPORT, PAGE 2

METEOROLOGICAL DATA FOR 1988

ASTORIA, OREGON

LATITUDE: 46°09' N LONGITUDE: 123°53' W ELEVATION: FT GRND 8 BARO 13 TIME ZONE: PACIFIC WBAN: 94224

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	48.0	53.6	54.0	56.6	60.5	64.5	68.6	67.9	66.4	62.6	53.4	49.6	58.8
-Daily Minimum	35.5	38.0	36.7	41.1	44.4	46.8	51.2	50.5	46.8	48.3	41.3	37.0	43.1
-Monthly	41.8	45.8	45.4	48.9	52.5	55.7	59.9	59.2	56.6	55.5	47.4	43.3	51.0
-Monthly Dmpt.	36.2	40.2	39.1	42.6	46.2	48.3	52.9	53.0	50.5	51.3	43.9	38.9	45.3
Extremes													
-Highest	60	67	64	71	79	79	93	88	88	77	63	61	93
-Date	27	26	17	9	21	14	19	22	1	9	5	3	JUL 19
-Lowest	27	24	28	30	35	40	43	42	37	33	32	26	24
-Date	2	2	15	8	5	11	7	21	11	27	14	18	FEB 2
DEGREE DAYS BASE 65 °F:													
Heating	713	552	1601	476	382	273	159	173	250	289	520	663	5051
Cooling	0	0	0	0	0	0	10	3	6	0	0	0	19
% OF POSSIBLE SUNSHINE													
AVG. SKY COVER (tenths)													
Sunrise - Sunset	9.0	8.6	7.4	8.2	8.8	7.3	5.4	6.4	6.0	8.3	9.2	7.8	7.7
Midnight - Midnight	8.8	8.0	7.2	8.0	8.3	7.0	5.7	6.5	5.8	8.0	8.6	7.5	7.5
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	2	2	3	3	1	3	13	7	8	2	0	8	50
-Partly Cloudy	2	4	7	4	3	11	5	11	7	6	3	2	65
-Cloudy	27	23	21	23	27	16	13	13	15	23	27	23	251
Precipitation													
0.1 inches or more	20	15	20	18	21	11	7	3	8	11	28	19	181
Snow, Ice pellets													
1.0 inches or more	0	0	0	0	0	0	0	0	0	0	0	0	0
Thunderstorms	3	0	0	0	0	0	0	0	0	0	5	0	8
Heavy Fog, visibility													
1/4 mile or less	5	3	2	4	1	1	3	5	3	12	0	5	44
Temperature °F													
-Maximum													
90° and above	0	0	0	0	0	0	1	0	0	0	0	0	1
32° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
-Minimum													
32° and below	8	5	9	3	0	0	0	0	0	0	1	5	31
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)													
	1017.6	1023.0	1022.4	1014.9	1016.6	1017.4	1019.3	1016.9	1018.0	1017.6	1012.2	1020.0	1018.0
RELATIVE HUMIDITY (%)													
Hour 04	86	91	90	89	92	92	92	93	93	93	89	89	91
Hour 10 (Local Time)	84	83	76	75	72	69	71	74	74	83	85	86	78
Hour 16	77	74	65	73	71	64	66	69	70	79	84	79	73
Hour 22	84	89	89	85	87	83	85	88	88	93	91	88	88
PRECIPITATION (inches):													
Water Equivalent													
-Total	6.57	3.60	7.86	3.99	4.09	3.50	0.96	0.88	1.23	2.14	13.06	7.32	55.20
-Greatest (24 hrs)	1.83	1.14	1.74	1.12	0.72	1.60	0.38	0.87	0.70	0.66	2.15	3.03	3.03
-Date	13-14	8-9	23-24	5-6	2-3	7	1-2	15-16	18-19	12-13	4-5	29-30	DEC 29-30
Snow, Ice pellets													
-Total	T	0.0	T	T	0.0	0.0	0.0	0.0	0.0	0.0	T	T	T
-Greatest (24 hrs)	T	0.0	T	T	0.0	0.0	0.0	0.0	0.0	0.0	T	T	T
-Date	15		27	29							24	30	DEC 30
WIND:													
Resultant													
-Direction (°)	129	190	237	234	220	288	303	246	264	189	183	132	234
-Speed (mph)	4.7	2.0	4.5	3.9	4.7	4.2	6.3	5.3	3.2	2.7	5.2	2.7	2.3
Average Speed (mph)	10.3	8.8	10.5	9.4	9.5	9.7	10.7	9.6	9.1	8.1	10.3	8.6	9.6
Fastest Obs. 1 Min.													
-Direction (°)	19	28	18	19	23	20	19	32	19	20	19	20	19
-Speed (mph)	45	33	41	38	25	28	29	23	28	28	35	33	45
-Date	14	15	22	2	28	2	12	30	25	15	5	30	JAN 14
Peak Gust													
-Direction (°)	S	W	S	S	SW	S	SW	NW	S	SW	S	S	S
-Speed (mph)	71	52	66	63	38	41	41	32	56	44	62	58	71
-Date	14	12	22	2	28	2	12	4	25	16	2	30	JAN 14

NORMALS, MEANS, AND EXTREMES

ASTORIA, OREGON

LATITUDE: 46°09'N LONGITUDE: 123°53'W ELEVATION: FT GPND 9 BARO 13 TIME ZONE: PACIFIC WBAN: 94224													
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Normals													
-Daily Maximum	46.8	50.6	51.9	55.5	60.2	63.3	67.9	68.6	67.8	61.4	53.5	48.8	58.1
-Daily Minimum	35.4	37.1	36.9	39.7	44.1	49.2	52.2	52.6	49.2	44.3	39.7	37.3	43.1
-Monthly	41.1	43.9	44.4	47.6	52.2	56.6	60.1	60.6	58.5	52.9	46.6	42.1	50.6
Extremes													
-Record Highest	35	67	72	73	83	87	93	96	95	85	71	64	100
-Year	1986	1968	1979	1987	1985	1955	1961	1981	1972	1987	1970	1980	JUL 1961
-Record Lowest	35	11	19	22	29	30	37	39	33	26	15	6	6
-Year	1980	1979	1971	1968	1954	1980	1971	1973	1983	1971	1955	1972	DEC 1972
NORMAL DEGREE DAYS:													
Heating (base 65°F)	741	591	539	522	397	251	158	143	199	375	552	679	5248
Cooling (base 65°F)	0	0	0	0	0	0	7	7	0	0	0	0	14
% OF POSSIBLE SUNSHINE													
MEAN SKY COVER (tenths)													
Sunrise - Sunset	35	8.4	8.3	8.1	8.0	7.7	7.5	6.7	6.6	6.3	7.2	8.1	8.4
MEAN NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	35	2.8	2.9	2.9	3.1	3.1	3.3	5.7	6.5	8.0	5.3	3.0	2.7
-Partly Cloudy	35	3.7	3.5	5.1	5.9	8.4	7.6	9.9	9.5	7.2	6.7	4.9	4.3
-Cloudy	35	24.5	21.9	23.0	21.0	19.5	19.1	15.3	15.0	14.8	19.0	22.0	24.0
Precipitation													
0.1 inches or more	35	21.7	19.4	20.6	18.2	15.1	12.8	7.5	7.9	10.7	15.6	20.4	22.4
Snow, ice pellets													
1.0 inches or more	35	0.7	0.1	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4
Thunderstorms	35	0.7	0.3	0.4	0.6	0.2	0.3	0.4	0.3	0.9	0.9	1.2	1.0
Heavy Fog Visibility													
1/4 mile or less	35	3.8	3.0	2.5	2.2	1.6	1.5	2.0	4.4	5.7	7.1	3.8	3.9
Temperature °F													
-Maximum	35	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.5
30° and above	35	0.7	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.1
-Minimum	35	9.5	6.3	6.2	2.1	0.1	0.0	0.0	0.0	0.0	0.5	4.5	37.3
32° and below	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AVG. STATION PRESS (mb)													
	16	1017.4	1015.7	1015.5	1017.7	1017.9	1018.2	1018.3	1017.7	1016.5	1017.3	1015.5	1017.4
RELATIVE HUMIDITY (%)													
Hour 04	35	86	87	87	88	89	90	89	91	91	89	86	88
Hour 10	35	83	83	78	74	73	71	75	76	76	73	84	78
Hour 16 (Local Time)	35	77	74	70	69	63	58	60	60	60	60	80	72
Hour 22	35	85	86	85	85	85	85	86	86	86	86	85	86
PRECIPITATION (inches):													
Water Equivalent													
-Normal	35	11.29	7.81	7.26	4.60	2.84	2.43	1.04	1.56	3.11	6.21	9.88	11.57
-Maximum Monthly	35	18.94	21.89	13.47	8.04	5.60	5.48	4.39	5.22	6.93	12.56	15.75	16.57
-Year	1954	1961	1956	1955	1960	1954	1983	1968	1978	1975	1983	1955	FEB 1961
-Minimum Monthly	35	0.69	2.60	0.93	1.33	0.37	0.65	1.01	0.08	0.04	0.52	1.45	2.67
-Year	1985	1973	1965	1955	1982	1987	1960	1970	1975	1987	1976	1985	JUL 1960
-Maximum in 24 hrs	35	5.12	3.28	2.66	2.26	1.32	2.42	1.38	1.65	2.63	3.71	4.19	3.61
-Year	1982	1986	1956	1965	1979	1968	1974	1968	1953	1982	1986	1974	JAN 1982
Snow, ice pellets													
-Maximum Monthly	35	26.3	4.0	6.7	1.1	?	0.0	0.0	0.0	?	?	1.6	13.0
-Year	1969	1962	1966	1975	1985	?	1985	?	?	1972	1964	1985	JAN 1969
-Maximum in 24 hrs	35	10.8	4.0	5.9	1.0	?	0.0	0.0	0.0	?	?	4.3	7.2
-Year	1971	1962	1960	1975	1985	?	1985	?	?	1972	1984	1985	JAN 1971
WIND:													
Mean Speed (mph)	35	9.1	9.0	9.0	8.7	8.6	8.6	8.7	8.1	7.6	7.5	8.7	9.2
Prevailing Direction through 1963		E	ESE	SE	WNW	NW	NW	NW	NW	SE	SE	SE	ESE
Fastest Obs. 1 Min.	35	17	19	19	20	22	20	19	23	20	20	25	17
-Direction (°)	35	55	47	44	52	37	29	29	28	35	44	46	52
-Speed (MPH)	35	1971	1979	1964	1962	1975	1962	1988	1961	1959	1962	1962	1961
-Year													JAN 1971
Peak Gust													
-Direction (°)	5	SW	S	S	S	S	S	SW	NW	S	S	S	SW
-Speed (mph)	5	75	70	66	63	45	41	41	37	56	47	62	67
-Date		1986	1987	1988	1988	1987	1988	1988	1986	1988	1986	1988	1987

ATTACHMENT I, WEATHER REPORT, PAGE 4

PRECIPITATION (inches)

ASTORIA, OREGON

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL
1959	13.24	8.04	7.88	4.40	3.45	3.77	0.91	0.92	5.56	6.48	11.40	8.36	74.41
1960	10.09	8.47	7.40	5.92	6.60	1.87	0.01	1.84	1.69	7.33	13.91	6.12	71.25
1961	9.03	21.89	10.69	5.47	2.90	1.10	0.50	1.30	1.45	7.32	8.34	10.40	80.39
1962	6.53	5.61	5.18	7.44	2.88	1.87	0.34	2.49	3.50	7.40	14.21	6.78	64.23
1963	4.76	6.44	6.13	5.76	1.91	1.80	1.52	1.20	2.20	9.58	13.16	9.12	63.58
1964	18.50	4.06	7.41	3.59	2.27	2.70	2.59	2.21	2.73	2.61	11.15	13.67	73.49
1965	16.59	6.77	0.93	5.47	2.74	0.75	0.46	1.95	0.51	3.97	11.82	1.78	63.74
1966	8.61	5.53	8.79	2.90	2.18	2.13	0.54	1.01	2.18	5.83	10.00	14.07	63.77
1967	14.95	6.07	8.38	5.52	1.37	1.14	0.22	0.19	3.07	11.06	5.94	9.04	66.95
1968	9.57	9.57	10.42	4.22	3.91	4.91	1.23	5.27	4.60	8.03	11.96	13.85	87.39
1969	12.02	5.67	3.16	3.84	3.92	3.63	0.56	0.62	6.55	5.28	5.77	11.69	62.71
1970	14.46	5.29	4.28	7.74	1.92	1.19	0.31	0.08	3.65	5.80	9.86	15.93	70.51
1971	16.69	6.67	9.96	4.09	2.30	2.97	1.55	1.14	4.65	6.34	9.08	13.83	79.27
1972	10.62	8.58	10.04	6.82	1.22	0.92	2.01	0.37	4.72	1.96	6.90	13.28	67.44
1973	5.72	2.60	5.71	2.38	3.16	4.26	0.07	0.46	4.19	5.92	14.93	15.75	65.15
1974	12.47	8.38	10.73	4.88	4.37	2.33	4.20	0.29	0.67	1.85	8.95	13.84	72.96
1975	15.21	8.03	5.66	3.90	2.41	1.59	0.22	2.82	0.04	12.56	12.28	15.66	80.78
1976	11.67	7.86	7.17	3.55	2.20	1.27	2.46	2.55	1.58	2.96	1.45	4.20	48.92
1977	3.20	5.22	9.74	1.65	6.00	1.36	0.44	3.85	5.44	4.38	12.37	14.34	67.99
1978	8.66	5.43	4.40	6.35	4.75	3.07	0.90	2.61	6.93	1.01	8.43	4.99	57.53
1979	3.83	11.76	4.52	4.38	4.19	1.82	0.92	0.81	4.35	8.46	7.87	13.18	66.09
1980	7.21	9.60	6.31	4.85	1.45	1.57	0.64	1.24	2.51	2.79	12.02	12.44	62.63
1981	2.63	8.69	5.80	7.30	2.97	5.47	1.06	0.66	2.77	8.67	10.66	11.80	68.44
1982	13.98	10.87	7.19	6.52	0.37	1.22	0.75	0.53	3.72	8.31	9.62	12.14	75.32
1983	13.52	8.66	8.84	4.26	3.59	2.53	4.39	1.44	1.83	1.97	16.75	12.44	78.82
1984	6.60	8.34	5.90	5.02	5.34	3.90	0.05	0.52	3.16	8.10	15.19	6.51	68.63
1985	0.69	4.09	7.00	2.95	1.90	3.09	0.78	1.11	3.23	8.11	5.96	2.67	41.58
1986	11.19	8.93	6.11	3.58	3.30	0.94	1.69	0.14	3.62	5.45	11.42	7.34	63.71
1987	10.38	5.08	8.52	3.02	5.41	0.65	1.10	0.95	0.52	4.33	4.32	3.85	47.53
1988	6.57	3.69	7.86	3.99	4.09	3.50	0.96	0.88	1.23	2.14	13.06	3.32	55.20
Record													
Mean	10.16	7.68	7.22	4.77	2.92	2.59	1.16	1.33	3.01	6.08	10.23	10.81	67.96

See Reference Notes on Page 58
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AVERAGE TEMPERATURE (deg. F)

ASTORIA, OREGON

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL
1959	43.7	43.0	45.0	49.4	52.2	56.8	60.3	58.8	56.4	53.3	45.6	42.2	50.7
1960	40.3	43.7	44.8	49.1	51.0	56.3	59.0	59.8	57.3	53.3	45.6	44.3	50.3
1961	47.3	46.6	45.8	47.5	52.6	58.7	61.9	61.4	59.4	53.3	45.6	44.3	51.4
1962	40.1	43.7	43.3	48.3	50.3	55.8	58.2	60.3	58.6	53.3	45.6	44.3	51.5
1963	36.9	49.7	45.0	48.0	53.0	55.9	60.3	61.2	61.2	53.3	45.6	44.3	51.5
1964	43.7	42.3	44.3	45.8	49.5	55.2	59.2	59.3	57.4	53.3	44.8	40.0	49.6
1965	42.3	44.2	47.2	49.3	50.9	56.2	60.2	61.7	57.0	53.3	44.8	40.0	51.1
1966	42.3	42.6	43.7	49.0	50.5	56.2	59.6	60.3	59.2	53.3	44.8	40.0	50.7
1967	43.8	43.2	42.2	44.0	51.7	58.3	61.1	62.8	60.5	53.3	44.8	40.0	50.8
1968	42.0	47.5	46.7	46.1	52.2	56.1	61.0	60.8	57.9	50.0	47.1	39.1	50.6
1969	34.3	40.3	44.3	46.8	53.5	59.6	63.6	58.7	57.2	53.3	46.5	44.1	49.6
1970	41.8	46.3	44.9	45.3	51.4	56.6	60.3	60.2	56.0	53.3	47.1	40.8	50.1
1971	40.7	42.2	42.0	46.5	51.4	54.6	60.3	62.4	57.9	53.3	46.8	41.2	49.7
1972	40.0	43.2	47.8	46.6	54.7	58.3	63.2	63.4	57.6	53.3	47.3	43.8	51.0
1973	40.5	44.3	44.4	48.9	53.4	56.6	60.3	61.9	57.9	53.3	47.3	43.8	50.3
1974	38.9	42.0	44.7	48.0	50.8	56.1	59.3	62.1	60.9	51.9	48.0	45.6	50.7
1975	42.9	43.1	43.8	44.9	50.2	55.6	60.7	63.3	59.2	53.3	46.8	43.3	50.4
1976	44.1	42.6	43.7	48.7	50.8	55.9	61.1	63.7	60.8	53.3	46.8	43.3	51.3
1977	39.9	46.8	44.6	48.9	50.2	56.8	61.1	63.7	60.8	53.3	46.8	43.3	50.5
1978	44.0	46.0	47.0	48.8	50.3	59.4	60.9	61.9	58.1	53.3	46.8	43.3	50.9
1979	35.3	41.8	47.3	49.2	50.8	56.8	62.1	63.7	60.8	53.3	46.8	43.3	51.5
1980	38.7	46.4	44.8	49.5	50.8	56.8	62.1	63.7	60.8	53.3	46.8	43.3	52.7
1981	40.2	46.6	48.1	49.5	50.8	56.8	62.1	63.7	60.8	53.3	46.8	43.3	51.2
1982	41.7	44.0	45.2	46.8	50.2	59.8	61.9	63.7	60.8	53.3	46.8	43.3	52.5
1983	47.3	50.2	50.9	50.2	50.2	55.6	61.9	63.7	60.8	53.3	46.8	43.3	50.4
1984	43.5	45.4	48.4	46.7	50.8	55.6	61.9	63.7	60.8	53.3	46.8	43.3	50.4
1985	39.3	40.3	42.8	48.4	50.2	56.8	62.1	63.7	60.8	53.3	46.8	43.3	51.8
1986	46.9	44.1	49.3	47.5	50.8	56.8	62.1	63.7	60.8	53.3	46.8	43.3	52.0
1987	43.7	46.3	48.0	50.4	50.4	57.4	62.1	63.7	60.8	53.3	46.8	43.3	51.0
1988	41.8	45.8	45.4	48.9	50.5	57.4	62.1	63.7	60.8	53.3	46.8	43.3	51.0
Record													
Mean	41.8	44.3	45.2	47.8	52.4	56.8	60.0	60.6	58.2	52.8	46.7	42.8	50.8
Max	47.7	51.1	52.8	55.6	60.2	64.2	67.7	68.5	67.4	61.3	53.4	48.7	58.2
Min	35.8	37.5	37.6	39.9	44.5	49.4	52.3	58.5	49.0	44.3	39.9	36.8	43.3

See Reference Notes on Page 68
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HEATING DEGREE DAYS Base 65 deg. F

ASTORIA OREGON

SEASON	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	TOTAL
1959-60	149	188	253	343	546	703	756	611	604	469	428	256	5317
1960-61	178	155	233	349	537	681	745	611	604	428	378	256	4841
1961-62	205	110	200	339	510	689	745	611	604	428	378	256	5491
1962-63	203	139	200	339	510	689	745	611	604	428	378	256	5019
1963-64	140	116	200	339	510	689	745	611	604	428	378	256	5092
1964-65	174	179	232	345	539	768	696	611	604	428	432	256	5257
1965-66	144	98	232	295	476	760	697	611	604	428	443	256	5166
1966-67	160	142	232	405	514	595	701	611	604	428	404	256	5157
1967-68	118	168	235	369	500	731	705	611	604	428	387	256	4890
1968-69	124	151	235	438	531	782	944	611	604	428	351	256	5558
1969-70	193	188	235	423	551	637	710	611	604	428	416	256	5313
1970-71	170	142	235	428	531	743	746	611	604	428	415	256	5633
1971-72	165	85	235	420	538	728	768	611	604	428	313	256	5119
1972-73	99	82	235	388	528	810	755	611	604	428	357	256	5157
1973-74	164	225	235	421	514	611	803	611	604	428	445	256	5518
1974-75	174	97	235	398	500	59	667	611	604	428	373	256	5078
1975-76	133	155	235	429	500	646	774	611	604	428	374	256	5141
1976-77	117	105	235	361	500	660	745	611	604	428	453	256	4946
1977-78	190	82	235	403	500	810	910	611	604	428	389	256	4908
1978-79	125	110	235	324	500	843	910	611	604	428	338	256	5439
1979-80	91	92	235	305	537	540	807	611	604	428	388	256	4755
1980-81	140	186	235	309	499	533	1013	611	604	428	354	256	4351
1981-82	139	107	235	372	474	604	144	611	604	428	391	256	4915
1982-83	171	112	235	428	466	681	543	611	604	428	282	256	4179
1983-84	109	98	235	448	489	834	558	611	604	428	433	256	5196
1984-85	160	155	235	452	544	780	71	611	604	428	383	256	5573
1985-86	131	172	235	438	500	788	551	611	604	428	373	256	5253
1986-87	188	120	235	308	500	635	54	611	604	428	306	256	4685
1987-88	151	139	235	321	500	741	113	611	604	428	306	256	5018
1988-89	159	173	235	320	500	663							

See Reference Notes on Page 6B
Page 5A

COOLING DEGREE DAYS Base 65 deg. F

ASTORIA OREGON

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	TOTAL
1959													
1960	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1961	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1962	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1963	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1964	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1965	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1966	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1967	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1968	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1969	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1970	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1971	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1972	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1973	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1974	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1975	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1976	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1977	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1978	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1979	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1980	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1981	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1982	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1983	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1984	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1985	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1986	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1987	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1988	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
1989	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000

See Reference Notes on Page 6B
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SNOWFALL (inches)

ASTORIA, OREGON

SEASON	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	TOTAL
1959-60	0 0	0 0	0 0	0 0	0 0	0 0	1 1	0 0	5 9	0 0	0 0	0 0	4 0
1960-61	0 0	0 0	0 0	0 0	T	0 0	0 0	T	0 4	0 0	0 0	0 0	0 4
1961-62	0 0	0 0	0 0	0 0	0 0	T	T	4 0	1 6	0 0	0 0	0 0	5 6
1962-63	0 0	0 0	0 0	0 0	0 0	0 0	0 3	0 0	0 0	T	0 0	0 0	0 3
1963-64	0 0	0 0	0 0	0 0	0 0	0 0	T	0 0	T	0 0	0 0	0 0	T
1964-65	0 0	0 0	0 0	0 0	T	19 0	10 7	0 0	0 0	0 0	0 0	0 0	29 7
1965-66	0 0	0 0	0 0	0 0	0 0	3 4	0 7	T	6 7	T	0 0	0 0	10 8
1966-67	0 0	0 0	0 0	0 0	0 0	0 0	T	T	0 7	T	0 0	0 0	0 7
1967-68	0 0	0 0	0 0	0 0	0 0	0 6	3 7	0 0	0 0	0 0	0 0	0 0	4 5
1968-69	0 0	0 0	0 0	0 0	0 0	4 5	26 3	1 0	0 0	0 0	0 0	0 0	31 8
1969-70	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	T	T	0 0	T
1970-71	0 0	0 0	0 0	T	T	1 8	16 1	0 2	1 5	0 2	T	0 0	19 8
1971-72	0 0	0 0	0 0	0 0	0 0	3 4	1 7	T	T	0 2	0 0	0 0	5 3
1972-73	0 0	0 0	T	0 0	0 0	5 4	T	0 0	T	T	T	0 0	5 4
1973-74	0 0	0 0	0 0	0 0	0 0	T	9 4	T	1 7	0 0	T	0 0	2 1
1974-75	0 0	0 0	0 0	0 0	T	T	0 3	0 2	T	1 1	T	0 0	1 6
1975-76	0 0	0 0	0 0	T	1 1	T	0 1	T	T	T	0 0	0 0	1 2
1976-77	0 0	0 0	0 0	0 0	0 0	T	T	T	T	0 0	T	0 0	T
1977-78	0 0	0 0	0 0	0 0	0 1	T	T	T	0 0	T	0 0	0 0	0 1
1978-79	0 0	0 0	0 0	T	0 1	2 5	0 3	T	T	T	0 0	0 0	T
1979-80	0 0	0 0	0 0	T	0 3	0 2	0 5	1 7	0 5	T	0 0	0 0	3 2
1980-81	0 0	0 0	0 0	0 0	T	T	0 0	0 0	0 0	T	0 0	0 0	T
1981-82	0 0	0 0	0 0	0 0	T	T	6 1	T	T	T	0 0	0 0	6 1
1982-83	0 0	0 0	0 0	0 0	T	0 0	T	0 0	T	T	T	0 0	T
1983-84	0 0	0 0	0 0	0 0	T	0 0	0 0	T	T	T	T	0 0	T
1984-85	0 0	0 0	0 0	T	T	T	0 0	1 1	T	T	T	0 0	1 1
1985-86	0 0	0 0	0 0	0 0	4 6	0 4	T	T	T	T	0 0	0 0	5 0
1986-87	0 0	0 0	0 0	0 0	T	0 0	T	0 0	T	T	0 0	0 0	T
1987-88	0 0	0 0	0 0	0 0	T	T	T	0 0	T	T	0 0	0 0	T
1988-89	0 0	0 0	0 0	0 0	T	T	T	T	T	T	0 0	0 0	T
Record	0 0	0 0	T	T	0 2	1 3	2 3	0 3	0 7	T	T	0 0	4 8
Mean													

See Reference Notes on Page 6B
Page 6A

REFERENCE NOTES

ASTORIA, OREGON

GENERAL

• TRACE AMOUNT
 BLANK ENTRIES DENOTE MISSING/UNREPORTED DATA
 # INDICATES A STATION OR INSTRUMENT RELOCATION
 SEE STATION LOCATION TABLE ON PAGE 8

SPECIFIC

PAGE 2
 PM - INCLUDES LAST DAY OF PREVIOUS MONTH

PAGE 3

• LENGTH OF RECORD IN YEARS, ALTHOUGH
 INDIVIDUAL MONTHS MAY BE MISSING
 • LESS THAN .05
 NORMALS - BASED ON THE 1951-1980 RECORD PERIOD
 EXTREMES - DATES ARE THE MOST RECENT OCCURRENCE
 WIND DIR - NUMERALS SHOW TENS OF DEGREES CLOCKWISE
 FROM TRUE NORTH - 00° INDICATES CALM
 RESULTANT DIRECTIONS ARE GIVEN TO WHOLE DEGREES

PAGE 4B

MAX AND MIN ARE LONG TERM MEAN DAILY MAXIMUM
 AND MEAN DAILY MINIMUM TEMPERATURES

EXCEPTIONS

PAGES 4A, 4B, 6A
 RECORD MEANS ARE THROUGH THE CURRENT YEAR,
 BEGINNING IN 1954 FOR TEMPERATURE
 1954 FOR PRECIPITATION
 1954 FOR SNOWFALL

ASTORIA, OREGON

Astoria is ringed by low mountains on the north, east, and south. On the west, the area is open to the Pacific Ocean at the mouth of the Columbia River. North of the station, 8 to 12 miles distant, the Washington hills rise to 1,000 to 1,200 feet. Maximum visibility is 19 miles north-northeastward to the Willapa Hills. East-northeastward 2 to 4 miles, the Astoria hills rise to 600 feet. East-southeastward 4 to 14 miles, consecutively, rise other ridges of the Coast Ranges, and southeastward is the most prominent landmark, Saddle Mountain, 3,283 feet high. Forests cover most of the uplands. From Seaside northward to the south bank of the Columbia are 18 miles of sandy beaches, and a 2 to 3 mile wide stretch of dune lands.

The airport sits by the south bank of the Columbia estuary, west of Youngs Bay, on the flood plain or tidal flats. Low dikes prevent flooding and increase the bog-like characteristics of the area. When air temperature falls below water temperature, fog forms easily, or rolls in from the ocean, river, or bay. This usually begins from late afternoon to early morning, and may persist well into the following day. During the summer months, sea breezes commonly blow up the river by noon and stop the diurnal rise in temperature. In winter, cold air may funnel down the Columbia from the interior.

Weather hazards occasionally occur. For flying, the greatest are fog and gales. Even with moderate surface velocities, wind and turbulence at 800 feet may be severe enough to upset a heavy plane. Even in fair weather, wind and wave may combine to produce a type of breaker known as the widow-maker and swamp a boat. Heavy rains inundate lowlands, and high tides aggravated by gales may push seawater across highways or up beaches. Rains may cause earthslides, mostly in highway cuts. Lightning strikes are rare. Showers of ice pellets may briefly whiten the ground during many of the months. Occasionally in winter there may be rather brief periods of freezing temperatures, with snow or ice.

The climate is generally healthful, except for dampness and a lack of sunshine in winter. Heat waves are uncommon and usually brief. Soil leaching necessitates supplementary mineral diets for both animals and plants.

Some New Light on the Astoria Column

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By 11 December 1925, the site, form and decorative scheme for the Astoria Column were in essence set, yet evidently there were still decisions to be made. Mr. Ralph Budd, president of the Great Northern Railway, and a man greatly to be admired for his combination of human warmth and inhuman attention to detail, said in a December 1929 memorandum to Mr. C. M. Hyskell, then chairman of the Portland Press Club, concerning the genesis of the idea for the column:

Ordinarily it was my idea merely to erect a very fine base for a large flag staff, which would carry a correspondingly large American flag. I outlined my idea to the architect, Electus D. Litchfield, in New York and he told me of some work the Artist Pusterla was doing in sgraffito, and together we formulated the plan of commemorating the various events that had transpired at the mouth of the Columbia River, beginning with its discovery and ending with the arrival of the railway train.¹

A telegram from Electus D. Litchfield² to Ralph Budd, dated 10 December 1925, notes that the cost for a 100 foot decorated column would be \$24,500, and the proposed obelisque \$1,450, which indicates that at that date the two alternatives were still under review. Yet the next day *Astoria Evening Budget*³ carried the glowing report of a shaft to be built which "will resemble the world famous Vendome Column." Litchfield had come to Astoria in October 1925 to examine the site, and according to the *Budget*,⁴ he was wildly enthusiastic over it, declaring the view from there the finest from the standpoint of scenic grandeur he had ever seen." The article also included a precise summary of the decorative program of the column and the process by which it would be effected.

When the column is built it will be given a strong basic color, either a dark green or Venetian red. Over this colored coat will be placed a thick layer of creamy white cement stucco. Before this layer of white has fully set the sculptor will chisel away portions of the white to the colored background. This will leave the sculpture bas-relief figures standing out in creamy white against the background of the darker color. The "sgraffito" method is an ancient one which has come down in Europe from classic times as one of the five methods of heroic sculpture.⁴

Though there were many participants in the entire project of building and decorating the column, there are four major figures of special interest: Ralph Budd, president of the Great Northern Railway; Vincent Astor, philanthropist descendant of John Jacob Astor, founder of Astoria; Electus D. Litchfield, architect; and Attilio Pusterla, artist. There can be little question of the origin of the idea of the column, which is the last monument in a series erected along the route of the Great Northern Railway. In his December 1929 memo to Mr. Hyskell, Ralph Budd listed the six monuments dedicated to "characters," as he called them, who were connected by outstanding events in the development of the West, and added:

It seemed as if these events, which marked the discovery, exploration, and occupancy of the Oregon Territory and had so much to do with that large area now comprising the states of Oregon, Washington, Idaho, and part of Montana called for more than an ordinary marker. The fact that the events to be commemorated were those of peaceful rather than war time character made them if anything more worthwhile.⁵

Electus Darwin Litchfield, architect, was born 25 April 1872, son of William B. Litchfield, builder of railroad and real estate empires. He was graduated from Brooklyn Polytechnic Institute and Stevens Institute of Technology. He was associated with a variety of architects until 1926 when he established his own office, first with Robert Wiseman, then Pliny Rogers at 36 E. 41st St., New York. When he died 27 November 1952 at the age of 80, he had headed his own firm at 80 5th Ave. for years. The *New York Times* lauded his leadership, and named among his architectural accomplishments many commercial buildings, Yorkship Village, Red Hook slum clearance; cited him as a leader against conversion of parts of Central Park into baseball and athletic fields; and also listed among his works the Denver post-office and courthouse, the public library at St. Paul, the National Armory in Washington, and "a monument to the Lewis and Clark expedition at Astoria, Oregon." He was a fellow of the American Institute of Architects, member of the Architecture League of New York, and director of the Citizens' Housing and Planning Council. He moved among the highest social levels in New York City.⁶ It is small wonder that when Ralph Budd sought an architect he should turn to the scion of a railroad family. It is the measure of Mr. Budd's humanity, and of what seems genuine humility, that he gives credit to Litchfield for the idea of the column as he did in the *Oregonian* report of the dedication,⁷ 25 July 1926, saying: "I have been given credit for the idea of the column, but this was Mr. Litchfield's idea—the architect."⁷

On 11 December 1925 Ralph Budd wired Mr. Litchfield that "Astoria people today have agreed to prepare site in accordance with your sketch and will begin soon clearing out dead trees."⁸ On the 14th he questioned the architect concerning Vincent Astor's acceptance of the round column and about the cost of stairs that Budd and the architect both felt to be necessary.⁹ A 29 January 1926 letter from John A. Lengby, Budd's executive assistant, to Frederick A. Bushnell, purchasing agent for the Great Northern, discussed at length the problem of the stairs—the sum being that they certainly should have a center support and be fastened at the sides at intervals. This discussion was mainly for bid purposes. But Litchfield had already made this decision, for in the 12 January 1926 revision of the drawings for the column, the staircase—with its center support—was already drawn. (Fig. 1.) On 16 February, A. J. Witchel, chief engineer of the Spokane, Portland and Seattle Railway, a part of the Great Northern line, and overseer of the Astoria project, wired Mr. Budd that the road to the site and site clearing were well underway. A. B. Guthrie Co., a Portland contracting firm, was awarded the contract to construct the column in reinforced concrete, and by 12 May the *Evening Budget* reported the column completed and ready to be decorated. The progress of the pouring can be seen in a graph kept of it now in the Burlington-Northern Railway Archives. No "temperament" is visible in its construction. Only poor geological information spoiled the time and fiscal tables. A letter from Litchfield to "My dear Mr. Budd" on 25 October 1926 states that he "was much shocked to hear from Mr. Witchel . . . that there was a charge from Guthrie for \$4,000 in addition to his contract in connection with the foundation of the column. I suppose this was due to finding that the bottom was not good at the point four feet below grade, as called for by the original contract plans." On 21 September 1926 George H. Hess, comptroller of the Great Northern issued a statement of expenditures to date on the column which indicates \$15,000 to A. Guthrie and Co., for construction, and to Portland Wire and Iron Works \$2,875 for the spiral stairway. Including Litchfield's \$1,000 designing fee, plus incidentals, and Pusterla's \$7,500 (including \$1,500 for supplies but not the \$758.96 over the

contracted amount), the total reached something over \$27,133.96. Vincent Astor provided \$20,000. Except for the \$200 Litchfield gave for the lettering, the Great Northern provided the remainder in addition to supervision of the whole project. The architect fared poorly, the artist fared better, and the building contractors fared best.

From the voluminous correspondence concerning the conception and details of building and decorating the column, Litchfield emerges as a man who is as concerned with the individual people associated with the project as he is with the most minute details of its successful progress, aesthetic quality and completion. Never familiar, always a bit aloof, he nevertheless showed the greatest concern over the smallest detail when acting as intermediary between the "practical" men of business and the "creative" artist. In a day-letter to his overseer Witchel, dated 15 May 1926, Ralph Budd answered Witchel's wire that "Artists for Astoria Column have not yet arrived on work," saying: "Artists who are doing the work are apparently showing some temperament and at last moment seem to have decided they can make enlarged paper posters in New York to better advantage for time being."¹⁰ Since 22 July was the target date for the dedication of the column which was the end and climax of the "Columbia Expedition," "temperamental" artists were hardly to be countenanced. Practical men needed practical solutions. But the architect knew better. In his letter of 20 May to Mr. Budd, Litchfield said:

The minute that we got the approval of the sketches, Pusterla and his assistants started to work on making of the cartoons. He had thought that he could save time by using photographic enlargements, but this did not prove to be the case and he is making them all by hand. I do not dare push him too hard for fear of making the aesthetic result suffer. He tells me it will be the end of June before he can finish all the cartoons. It is my idea to follow him closely and to plan to have him leave with whatever he has ready not later than the 25th of June with the idea of getting on whatever he can between that date and the 22nd, and with the understanding that the remainder of the cartoons will be finished at Astoria.¹¹

One can imagine the position Ralph Budd was in. The "Columbia Expedition" was a major undertaking for the Great Northern; 22 July was the dedication deadline and President Budd expected his trains to run on time. Was this the way to run a railroad? A temperamental artist threatened all plans. In a letter of 21 May 1926, O. S. Bowen of the Passenger Traffic Department of the New York Office of Great Northern stated that: "Mr. Litchfield is very much disturbed about the matter and at a loss to know just what to do. He has asked me to see Mr. Pusterla, look over his work and form an opinion as to what progress we might expect . . ."¹² Litchfield had written the artist on the 20th, and Pusterla replied:

Replying to your letter of the 20th inst. I say that I am doing my best to rush work on the cartoons and will be ready to show some this week, if you let me know which day you prefer to come over to my house. I cannot pay extra artists to help me, because it is not pure mechanical work that I am doing, there are details and alterations to be made, and I must attend personally. I have divided, the one inch to foot sketch, in 26 horizontal strips; the total length of the column being 89 feet, the full size cartoons are three feet and five inches wide. Working hard, as am doing now, the average production will be four strips per week. I started on May 17, and to complete all cartoons without any interruption it takes till June 30th, but if you think advisable that I should go to Astoria to have some work done on the column in time for the dedication, I will stop working here on June 19, four weeks from now, making a total of 20 strips and do the balance later over there . . . In this way, I will be able to make some show in time and please Mr. Budd and yourselves.¹³

On 24 May Bowen reported to Mr. Budd:

I think Mr. Litchfield is in favor of just about this

(Pusterla's) plan and understand Mr. Pusterla has outlined the same fully to him by letter. It would seem to me this is the most practical manner of handling the matter and insure the completion of enough of the column by the 22nd of July so that those present at the dedication can get some good idea of what the completed work should look like.¹⁴

The dedication deadline was but one problem concerning the decoration of the column. The program was a complicated one, and many critics availed themselves of the opportunity to advise both artist and builder. A letter of 13 May 1926 from an Agnes C. Lant is typical as she noted: "Saw yr. 'sculp' and Mr. Litchfield yesterday. Like 'temperamental' chap. He's a big artist and panels are magnificent. Only one minor point needs significant change. Chinook dugouts are one piece, not planked nor ribbed like keel boat and canoe . . . Mr. Pulaska [sic] has done remarkable work."¹⁵

There were also suggestions by Ralph Budd as late as 22 July. After he had gone over the drawings with Pusterla, and perhaps with some consultation with Judge Carey, member of the Oregon Historical Society who on 25 May had wanted to examine a print of the cartoons, Mr. Budd wrote to Witchel: "There seem to be some horses, especially a spotted one, in the foreground just to the left of Gray's portrait. There were no horses on the Columbia at that time."¹⁶ (Fig. 4.) There were several other suggestions for historical accuracy, with one very perceptive one: "In the center of the strip, the sign 'Fort Clatsop' appears as a decorative sign-board. I understand that this will be changed to a cartouche and as such will be all right."¹⁷

But there is little doubt as to the originator of the decorative program itself. In his 1929 letter to C. M. Hyskell, Mr. Budd, in a characteristically selfless way, noted his original idea for a large flagstaff on Coxcomb Hill, then added:

I outlined my idea to the Architect, Electus D. Litchfield, in New York and he told me of some work the Artist Pusterla was doing in sgraffito, and together we formulated the plan of commemorating the various events that had transpired at the mouth of the Columbia River, beginning with its discovery and ending with the arrival of railway trains. The design of the column, which is 125 feet from bottom to top, was Mr. Litchfield's and the decorations were Mr. Pusterla's.¹⁹

Pusterla's was not completely a "labor of love," as Mr. Budd put it. Though a reading of the records reveals the misunderstanding involved in the amount he expected, and the payments themselves, where Litchfield stands staunchly by the artist, it is clear that Pusterla received in several separate payments \$6,758.96, which was some \$758.96 over the contract price of \$6,000. He was to be given an additional \$1,500 for lime, sand, and plasterers' wages. This was duly paid, as well as an additional \$200 for lettering beneath the cupola.²⁰

To date there has been little solid work published on Attilio Pusterla, though work is in progress. In 1970 Ms. Paola Piva of Milan was busily engaged on a biography of the painter, as was Dr. Annie-Paule Quinsac of Sloane College, University of South Carolina, whose now-published work includes half a chapter on Pusterla.²¹ Thieme-Becker gives only the briefest notice of him, having him emigrating from Italy to South America.²² According to the *New York Times* obituary of 2 May 1941, Attilio Pusterla was born in Milan, Italy in 1862 and came to this country in 1899 after studying under Cremona and Seggantini. The latter was Giovanni Seggantini, whose work developed from the divisionist style to a personal one in which the brilliance of the impressionist effects of light was fused with a firm outline. He left his mark on Pusterla, who became a leader in the impressionist movement in Milan but retained to the end the firm outline to be seen in the decoration of the Astoria Column. He settled in Woodcliff, New Jersey. He was in demand. He provided murals for the Parliament Building in Ottawa, for the Astoria Column, and had designed those for the New York County Courthouse but was not to begin painting them until 1934 under the auspices of the W.P.A. in New York City. He also executed private commissions such as those for the home of Edward Stettinius, Jr. and the Billings Mansion, Locust Valley, Long Island.²³

By Friday, 11 December 1925, Litchfield had an agreement with Pusterla that the artist would do the work and have the preliminary sketches in hand when Ralph Budd presented plans for the monument to the Astoria Park Commission. In a telegram dated 14 December 1925 Litchfield wired Ralph Budd that: "Beleive [sic] historical sketch best made by sgraffito artists working with us."²⁴ The telegram reveals his interest in the decorative method and his knowledge of Pusterla. By 12 May 1926 Pusterla had signed a contract for the decoration of the column. But he was not one to be rushed, as we have seen. On the 15th Mr. Budd complained of his hindering "temperament." The 18 May *Evening Budget* reported the column nearly finished and that the "sculptors" were to be in Astoria the following Monday.²⁵ As we have seen, Litchfield wrote Mr. Budd on 20 May defending Pusterla. A. H. Hoge and of the Great Northern staff insisted upon a definite deadline in his letter covering the Pusterla contract, which had been completed 21 May.²⁶ Of course Ralph Budd's concern was how the column would look at the dedication. On 31 May he wrote Litchfield: "It will be pretty hard for the guests to visualize the complete column unless a fair amount of the decoration is in place . . ."²⁷ By 1 June he wrote A. J. Witchel that: "The attached correspondence shows that my fears about the decorative work on the Astoria Column were only too well founded."²⁸ He wished Witchel to help Pusterla in every way, saying: "I think he is an earnest and hard working artist, but he seems to be very temperamental and has already shown some misgivings about the movable scaffold."²⁹ On 2 June Litchfield wrote Mr. Budd asking that space be provided for Pusterla when he arrived at Astoria, and that the work could be speeded up if a frame of 9 x 40 feet could be provided for him on which to fasten paper for doing the cartoons. He added: "I am most gratified with the energetic and practical way in which Pusterla is going ahead with the work. The drawings which he is making are outline drawings following very exactly the sketches which we have approved, and he will work from the original sketch in filling in the outlines on the column."³⁰ Mr. Budd agreed and wrote Witchel on 4 June to complete arrangements for Pusterla. But on the 14th the artist was still not in Astoria. Budd's terse wire to Litchfield ran: "Did Pusterla leave twelfth as planned?"³¹ To which the architect replied immediately: "Pusterla leaves Tuesday night. Regret could not get him off sooner."³² On the 17th Budd wired Witchel from St. Paul: "Pusterla is on the Great Northern Limited out here this morning. Hope you will be able to help him get settled at Astoria and assist him in every way to expedite his work and to keep him well satisfied."³³ The strange thing was that he had to be humored to get the work done. The artist did get enough done on the column so that those at the dedication could get some good idea of what the completed work would look like.³⁴ In photographs taken at the 22 July dedication (Fig. 2 and 3) one can see that he had at least three turns completed. At the dedication which had occurred as planned 22 July, Mr. Budd gave high praise to Pusterla, as is reported by the *Oregonian* of 25 July.

Now just a word about the artist. I visited Mr. and Mrs. Pusterla in their vine-covered cottage and flower-bower clinging to the side of this hill yesterday afternoon. Probably no more happy circumstance could have come about than the beauty of their little home here, reminiscent as it is of the beauty spots of their native Italy. Perhaps it is too lovely, for Mr. Pusterla told me yesterday that he liked it so well here that he was going to make the job last as long as he could./ Mr. Pusterla is an artist who enjoys a notable reputation for his achievements in the process that is being employed on this monument. Incidentally I am told that this is the first time that this process has been employed on a column. Mr. Pusterla has his heart in his work, and they tell me that frequently he goes to work in the morning and chisels out something he has done the day before and does it over again, because when looking from the ground it has not satisfied him.³⁴

On 16 August Witchel wrote Ralph Budd that "Mr. Pusterla has

laid off from the actual work on the column and is bringing his drawings well up, therefore the progress of the art work on the column has been somewhat delayed."³⁵ He then reported to Mr. Budd on 30 August that the artist would have completed two-thirds of his work by 31 August, despite rainy weather.³⁶ Again, on 7 September he wrote: "If at all possible, it is desirable that Pusterla receive his voucher not later than 15 September, the date it is due. Because of the delay in August payment reaching him, he was on the point of stopping work and returning to New York."³⁷ The payment voucher was dated 9 September 1926; the check was sent 10 September. On 15 September Mr. Witchel wired Ralph Budd that Pusterla was working on the fourth strip from the bottom and estimated that he would finish by mid-October. On 22 September he wired again saying that the work was sixty-five percent complete. On the 25th he wrote:

I wired you yesterday with respect to the status of Mr. Pusterla's work on the Astoria column. He is doing his best to complete it before the really bad weather starts, working as long as possible every day, taking but a short time for luncheon, just five or ten minutes. When I was there Thursday he had about half completed the pictures of Jefferson, Lewis and Clark, and all of that part to the right of the pictures for half the circle of the column. He figures that with any reasonable weather he can complete the work by the end of next week. He then intends to have the staging raised to the top of the column and go over the egg and dart design on the moulding along the lines that Mr. Litchfield requested in July. There are also some other corrections to be made at various points on the column which he will do at that time. He told me it would take him about five days to go from the top to the bottom, hence he should finish his work about the middle of October.³⁸

On 1 October Witchel wrote Litchfield that on that date Pusterla had completed eighty-five percent of the work on the column. On 14 October, when he wrote concerning Samuel Lancaster's suggestions for design changes, he indicated that Pusterla should be done by 23 October. The completion had been complicated by the additional lettering beneath the cornice of the cupola which Pusterla and Litchfield had agreed was needed and Litchfield paid for himself³⁹ when Budd felt that the Great Northern had "gone just as far as we can." On 25 October the architect wrote Mr. Budd that:

I do not like to think of you personally bearing any of the cost of the monument. On receipt of your letter, I wired Pusterla to go ahead with the lettering beneath the cupola and charge the cost to me. There is much greater justification for my standing this expense than for your standing any of it. It will mean much to me to have it a thorough artistic success.⁴⁰

On 2 November 1926 W. H. Marsh wired that "Pusterla will leave Portland No. 2 tonight." and Witchel wrote President Budd that "On November 1st, 1926, Mr. Pusterla left Portland for New York on S.P.&S. train No. 2 evening of November 2nd, 1926."⁴¹ (Fig. 5.)

On 4 December 1926 Litchfield wrote Mr. Budd tendering his final bill in connection with the column, adding:

I was very much pleased with Mr. Pusterla's work, and the only change that I should have made was to have reduced the spottiness of the sgraffito decoration on the last two or three turns. Mr. Pusterla assures me that the considerable contrast which shows in the photographs does not exist on the actual column, and I am praying that this is the case . . . and shall await with great pleasure the verdict of competent critics of our endeavor.⁴²

On 28 December the architect wrote Mr. Budd again:

In Mr. Witchel's letter he writes that while they have had some very heavy storms this winter, 80 mile gales accompanied with rain, the work apparently stands unblemished, and also emphasized the fact that though it appeared that the stipulated \$1500 would be exceeded, Pusterla maintained his standard of tho-

roughness throughout. I join with Mr. Witchel in my appreciation of Mr. Pusterla's splendid work and the spirit in which it was done.⁴³

On 25 May 1928 A. J. Witchel wrote a note to Ralph Budd concerning the state of the column which the latter sent on to the architect. Litchfield replied that Pusterla saw no problem in spottiness and darkening resulting from dampness.⁴⁴ On 20 August Litchfield wrote then Mayor J. D. Ten-Brook that though he did not see any problems in the photographs from the Woodfield Studio:

It would be a very good thing if you could arrange for an authorization to cover the cost of having Mr. Pusterla make a visit to Astoria next Spring and look over the sgraffito decoration on the monument. If he thinks it needs strengthening you could then arrange to have the scaffold rebuilt and hung from the top of the monument so that he could go over the entire decorative work as would seem advisable while the weather is favorable.⁴⁵

A letter from Jean H. Hallaux, Manager of the Astoria Area Chamber of Commerce, 14 July 1970, indicated that Pusterla returned twice to Astoria, once to redo the original, and once to retouch the southwest side when it faded. Hallaux also added that the lack of plans had hampered the city engineers in their repairs, and that perhaps the Great Northern might have them.⁴⁶ They did. Through the good offices of Mr. James A. Hagle, Portland Manager of Public Relations for the Burlington Northern, the full file of correspondence, wires, contracts, etc. concerning the column was obtained. Among the items in it were Litchfield's drawings, reproduced as Figure 1.

Though the Great Northern supervised the building of and contributed to the cost of the column, the chief benefactor of the project was Vincent Astor, great-grandson of John Jacob Astor, fur and real-estate baron, founder of Fort Astoria. Vincent, who died 3 February 1959 at the age of 67, broke two family traditions—deserting the aristocratic stance to spend his time and money on social reform and sociological problems, and taking a personal hand in the management of his own fortune. He must have done well with the latter for he increased an \$87,200,000 inheritance to a reported \$127,000,000 figure. Save for some \$2,000,000 left his widow and some \$827,000 to various others, the bulk of his estate was left to the Vincent Astor Foundation which he founded "to alleviate human suffering."⁴⁷ There is precious little in the available correspondence to let us know Astor's reasons for supporting construction of the column, and little is likely to become available. In answer to the author's inquiry of 12 November 1970, Mr. Allan W. Betts, his executor, said: "All such papers were destroyed long ago. No records exist for years prior to 1959."⁴⁸ We can assume that his special interest in railroads, his philanthropic turn of mind, his interest in art, and perhaps his respect for this forebear, led him to support Ralph Budd's request for \$20,000 for the column with but three stipulations: 1) that the residents of Astoria should approve the plan; 2) that the city should clear and level the summit of the hill, build walks, and beautify the place; and 3) that they should agree to maintain it.⁴⁹ In his letter of 6 December 1929 to Hyskell, Ralph Budd said: "I knew of the reverence in which Mr. Vincent Astor held his great-grandfather, John Jacob Astor, and of the interest he had in the latter's commercial activities in the West. It was, therefore, natural and easy for me to arouse the sympathetic cooperation of Vincent Astor for the project I had in mind."⁵⁰ Astor did not attend the dedication. On 23 August 1926 E. G. Chadwick, writing for Vincent Astor who was in Europe, offered to send a check for the Astor contribution and on 8 September sent the sum of \$20,000.⁵¹

And, what of the name of the monument in Astoria? In the 10 December 1925 wire to Ralph Budd from Litchfield we find: "Best fig. Astoria Monument to date, etc." In his 17 August 1926 reply to Dr. Fred E. Chambers concerning a painting he wished to use on a postcard, Ralph Budd said: "I think, however, you may wish to change the name at the bottom as the column is officially known as the 'Astoria Column'."⁵²

In his 15 February 1927 letter to Mr. Budd, Electus Litchfield queried:

I noticed, in a clipping from the Astoria paper the account of the visit of yourself and Mr. and Mrs. Curtiss James to Astoria, in which the column was referred to as the 'Astor Column'. I rather like the designation and I should like to know whether it is correct to so call it, or whether it was just a misprint, and that it should be referred to, as originally contemplated, as the 'Astoria Column'.⁵³

Mr. Budd replied 21 February 1927: "I think the official name 'Astoria Column' should be followed, especially as to call it 'Astor Column' would tend, I think, to emphasize the work of Astor and minimize Gray and Lewis and Clark."⁵⁴ In his 10 December 1929 memorandum in answer to the 6 December 1929 request of C. M. Hyskell of the Portland Press Club for information on the column Mr. Budd began: "The Astoria Column is one of a series of monuments located along the Great Northern Railway to commemorate outstanding events in the progress of pioneers in conquering the western wilderness."⁵⁵ The monument is the "Astoria Column", the work of many men, but it is especially the reflection of the collaboration of Vincent Astor, financier, Ralph Budd, businessman, Electus Litchfield, architect, and Attilio Pusterla, artist. (Fig. 6.)

1. This paper is based largely upon documents housed in the archives of the Burlington-Northern Railway, 176 East 5th St., St. Paul, Minnesota. A footnote will carry the initials B-N to indicate material taken from this source.

2. B-N.

3. *Astoria Evening Budget*, Dec. 11, 1925, p. 1.

4. *Ibid.*, p. 2.

5. B-N.

6. *The National Cyclopaedia of American Biography*, ed. Raymond D. McGill, 56 vols. (New York, 1968) L, 192-193.

7. *Portland Oregonian*, July 25, 1926, p. 83.

8. B-N.

9. B-N.

10. B-N. A photograph of what seems to be one of the cartoons made by Pusterla is in the possession of the City of Astoria.

11. B-N.

14. B-N.

12. B-N.

15. B-N.

13. B-N.

16. B-N. When Judge Carey's papers become available his contribution will be clearer.

17. B-N.

18. B-N.

19. "The Astoria Column Dedicated," *The Oregonian*, July 25, 1926, p. 14.

20. B-N.

21. Annie-Paule Quinsac, *La Peinture Divisionniste Italienne* (Paris, 1972), pp. 179-185. See also Agostino Mario Commanducci, *Dizionario Illustrato dei Pittori e Incisori Italiani Moderni (1800-1900)*, 2 vols. (Milano, 1934), II, 566.

22. Ulrich Thieme and Felix Becker, *Allgemeines Lexicon Der Bildenden Kunstler*, 37 vols. (Leipzig, 1933), XXVII, 469.

23. "Attilio Pusterla, Mural Painter, 79," *New York Times*, May 2, 1941, p. 21:2.

24. B-N.

25. B-N. "Column Is Nearly Finished, Sculptors To Be Here Monday," *Astoria Evening Budget*, May 18, 1926, no pg. no. given with clipping.

26. B-N.

31. B-N.

36. B-N.

27. B-N.

32. B-N.

37. B-N.

28. B-N.

33. B-N.

38. B-N.

29. B-N.

34. B-N.

30. B-N.

35. B-N.

39. B-N. Letter to Mr. Budd from Mr. Litchfield, Oct. 14, 1926, including design for the lettering.

40. B-N.

43. B-N.

41. B-N.

44. B-N.

42. B-N.

45. B-N.

46. Personal letter from Jean H. Hallaux, July 14, 1970.

47. "Vincent Astor Dies in His Home at 67," *New York Times*, Feb. 4, 1959, pp. 1:2, 33:3 and 33:4. "Rites For Astor Attended by 400," *New York Times*, Feb. 7, 1959, p. 19:3.

48. "Vincent Astor 127 Million Estate," *New York Times*, Jan. 1, 1960, p. 16:5.

49. Personal letter from Mr. Betts.

49. B-N. and *The Oregonian*, July 25, 1926, p. 14.

50. B-N.

53. B-N.

51. B-N.

54. B-N.

52. B-N.

55. B-N.

Professor Kimbrell earned his M.S. and M.F.A. at the University of Oregon, where he was one of Marion Ross's students. He went on to the State University of Iowa to earn his Ph.D. in art history, and now heads the Department of Art and Architecture at Portland State University. His research on the Astoria Column was first presented as a lecture to the Chapter in 1973.

ATTACHMENT III

ASTORIA COLUMN

INSPECTION NOTES - STRATA BEFORE CLEANING August 1989

EXTANT STRATA MODELS

1	2	3	4	5	6	7	8	9	10
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STRATA	COMMENTS	NOTES
<u>OUTERMOST</u>		
1988 SOIL/VEGETATION	Adhered to tung oil	Removed
1958 MEDALLIONS	Restoration, peeling white , latex paint	Removed
1958 TUNG OIL	Oxidized, darkened, acidic	Removed
1948 TUNG OIL	Oxidized, darkened, acidic	Removed
1936 WATER REPELLENT	Oil based "Dehydratine"	Removed?
1936 HIGH PIGMENT CEMENT PLASTER	Restoration by Pusterla, small crackle, with unknown coarse filler; black/yellow/tan/beige	
1936 PIGMENTED CEMENT PLASTER	Restoration by Pusterla?, spongy, plaster/pigment mix, highly alkaline, poor adhesion, much lost	
1926 PIGMENTED HIGH LIME PLASTER	Original by Pusterla, carved, thin layers of yellow/white beige/tan	
1926 PIGMENT CEMENT MORTAR	Original, one-eighth to one-quarter inch thick, dense, well adhered, chocolate brown	
1926 CEMENT MORTAR SKIM COAT	Dense, solid, well adhered, one-quarter to one inch thick	
1926 REENFORCED CONCRETE	Dense, solid	
1968 SHOTCRETE/STEEL GRID ON INTERIOR	Rusted, cracked	
<u>INNERMOST</u>		

Analyzed by Andrew Held, PhD, of MEI-CHARLTON, INC, 2233 S.W.
CANYON ROAD, PORTLAND, OR 97201-2499

DEC 2 SUMMARY - AH

SAMPLE 143; Core (East Face) AC143 JUL88 E

① INTERNAL CONCRETE

LARGE AGGREGATE ~ 25% (SAMPLE TOO SMALL FOR GOOD ESTIMATE)

SIZE: ~ $\frac{1}{4}$ inch to $1\frac{1}{2}$ inch dia.

COMPOSITION: LOCAL RIVER GRAVEL OR BEACH GRAVEL - NOT
WELL WORN, therefore not from below tide line or Columbia River bars.

FINE AGGREGATE (SAND) ~ 38%

SIZE: $0.34 \text{ mm} \pm 0.17 \text{ mm}$ (O value)

SHAPE: ANGULAR, FROM LOCAL SMALL RIVER LIKELY, partly
crushed (50%?)

COMPOSITION: SIMILAR TO LARGE AGGREGATE, BUT MORE
VARIETY + MORE QUARTZ + HIGH SILICA MINERALS
MOSTLY FELDSPAR, QUARTZ, PYROXENES,
10-20%

FINES

SIZE: $0.03 \text{ mm} \pm 0.0016 \text{ mm}$

SHAPE: ANGULAR

COMPOSITION: QUARTZ, FELDSPAR, Calcium Carbonate
Many yellow particles - more than would be expected
as fines from the aggregate, unless the aggregate has
a very brittle yellow mineral.

MATRIX

10-20%

AMORPHOUS - many fine grains ^{seen above} may be from
from the portland cement (calcium carbonate from calcium oxide)

COMPOSITION: Presumably Tobermorite gel + Calcium Carbonate
NO RESIDUAL Calcium oxide found
~ 5%

VOIDS

1B INTERFACE TO CONCRETE OUTER LAYER

APPROX 0.1 to 0.2 mm thick of matrix material
enriched in Calcium Carbonate

CONDITION

GOOD, NO SHARP LAYERS, NO INCOMPATIBILITY

CONDITION:

NO CRACKS FOUND

APPARENTLY INTERNAL CONCRETE WAS IN A SMOOTH WALLED FORM,

FORM REMOVED, OUTER LAYER TROWELLED ON

page 2

② CONCRETE OUTER LAYER

THICKNESS : VARIABLE, 0.8 to 1.5 cm

LARGE AGGREGATE : NONE

FINE AGGREGATE : SAME AS INTERNAL CONCRETE !

FINES : " " " "

MATRIX : " " " "

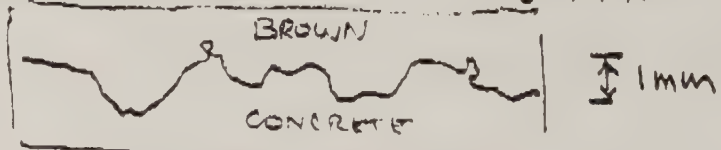
VOIDS : " " " "

CONDITION

: CRACKED PERPENDICULAR TO FACE.
 CRACKS EXTENDING DOWN TO BASE OF THE
 OUTER LAYER. APPROX 1 INCH INTERVAL
 BETWEEN CRACKS. LIKELY FREEZE - THAW
 CRACKS (SURFACE PROFILE LIKE MUD CRACKS)
 AND DIMINISHING WITH DEPTH. MOST OF THE
 CRACKS HAVE REWORKED INTERNALLY - SELF
 HEALING TO SOME EXTENT. (Possibly because
 of the high lime concentrations at the surface.)

②B INTERFACE TO BROWN LAYER - GOOD CONDITION

THE OUTER LAYER CONCRETE WAS SURFACE
 ROUGHENED
 AND BROWN
 COAT APPLIED



WHILE THE OUTER LAYER CONCRETE WAS
 STILL WET

The use of the roughened surface gave more voids at interface
 than one would like

③ BROWN LAYER (BASE COAT)

THICKNESS: 3 mm COLOR - DARK CHOCOLATE - Munsell 2.5YR 3.5/

AGGREGATE: (SAND) 58%

SIZE: 0.32 mm \pm 1.1 mm

SHAPE: ROUNDED (NOT CRUSHED)

COMPOSITION: DIFFERENT FROM CONCRETE SAND -

SIMILAR MINERAL SUITE BUT DIFF SOURCE.

Feldspars dominant - not a high quartz sand

Local small river? + small amt of CaCO_3 (marble chips)

MATRIX: Portland Cement with Iron oxide and Iron Silicate

- pigments - not burned

Fe/Mn ratio \sim 4:1 + 10:1 + some ilmenite (1:1)

- CLASSIFIED AS RAW LUMBER TYPE -

CONDITION: GOOD, SOME CRACKING (FREEZE-THAW) IN ADDITION TO THE CRACKS COMING UP FROM THE CONCRETE.

③8 INTERFACE TO 1ST STUCCO LAYER

SHARP, ROUGH SURFACE (\sim 0.3 mm peak to valley)

APPLIED SO GRAINS WOULD STICK UP PROVIDING

ANCHOR FOR THE STUCCO LAYER

page 4

④ 1ST STUCCO LAYER

COLOR - Reddish Chocolate (light)
 MUNSELL COLOR 5-7.5 YR 8/4 for
 the matrix material in microscope.

THICKNESS - UNKNOWN

GRAINS - ~~EPIDOTE~~ and other high silica minerals
 ~ 70 million, size ~ 35 μ m
 - CALCIUM CARBONATE ~ 20%
 GROUND LIMSTONE OR MARBLE 5/50-300 μ dia = 5%
 PIGMENT - BURNED WOOD 15%
 Fe:Mn = 5:1

MATRIX - CALCIUM CARBONATE - FROM ~ 15%
 LIME?

Possibly contains - 10-15% Portland cement.

④B. INTERFACE TO 2ND STUCCO LAYER - dark line separates
 1st from 2nd layer - oxides were concentrated
 at the surface because of weathering? Air-borne
 dirt & dust? Color is consistent with oxide
 enrichment.

page 5

⑤ 2nd STUCCO LAYER

COLOR - YELLOW (BUTTERSCOTCH?)

MUNSELL COLOR (MICROSCOPE) = 10YR 8/8

(10YR 9/8?)

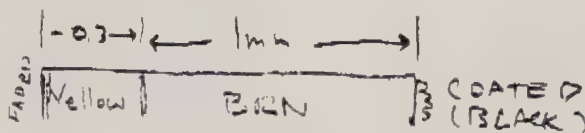
GRAINS	100-250 micron ground marble	10%
	fine " "	10-20%
	SILICA	10-20%
PIGMENT	UMBER, RAW	10%
	CLAY ?	20%
MATRIX	CALCIUM CARBONATE FROM LIME	25%

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page 6

SAMPLE #106 (25 JUL 89)

2 LAYERS + COATING



(Rest. paint/plast. Before cleaning)

① DIRTY CHOCOLATE - HARD

50% COARSE CRUSHED SILICA

20% UNBURNED UMBER - 20μ size

30% 20μ size limestone + lime

likely contains Port. Cement

①A Coating on brown layer has mud cracks + black material in spots that appears like dirt + greasy material.

② YELLOW - HARD

50% COARSE CRUSHED SILICA

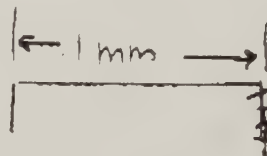
20% Yellow fine ochre

Remainder lime, fine silica, clay?
(CaCO_3 , now)

#107

(26 JUL 89 N/E L-4)

① Yellow - med. hard.



50% COARSE CRUSHED SILICA

20% Yellow fine ochre

Remainder lime, fine silica, clay?
(CaCO_3 , now)

N/E L-4
(Rest. plaster before cleaning)

(Per Hand telecon, 1300)
Port Cement/Lime
much leaching

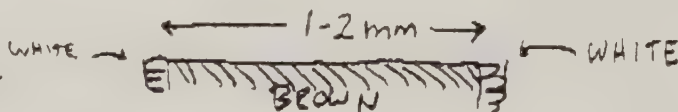
(Some tar on surface)
incrustation from sides

①A Black material on surface loses color + dissolves in HCl
SEM indicates ORGANIC MATERIAL

#109

Jul 89

CHOCOLATE



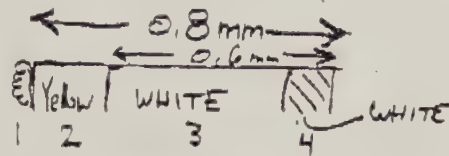
(S/S/W L-3 metal plate)

BROWN WITH CaCO_3 crystals (vein) on both sides
this is highly altered brown base coat material - much calcite deposited in it.

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P.8

#113

(7 AUG 89
S L-14 medalion)

p7

- ① DIRT ON YELLOW LAYER SURFACE
- ② YELLOW LAYER - LIME + OCHRE PIGMENT (20 μ), much like yellow layer on core sample, some haematite.

- ③ WHITE LAYER

50% COARSE CRUSHED LIMESTONE (MARBLE)
 50% FINE VERY WHITE LIME, LIMESTONE, & CLAY
 VERY HIGH SILICA CONTENT IN MATRIX - PORT,
 CEMENT? SILICONE?

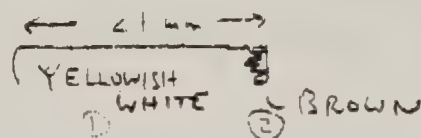
- ④ WHITE PAINT OR MASTIC

#114

BAG HAD HOLE - NO SAMPLE - JUST DUST (24 AUG 89
BASE RESIDUE)

20-40% Haematite, goethite, + black iron oxides (20 μ + less)
 20-40% Silica, clay
 20% CaCO₃

#115

(25 AUG 89
N/E L-9
ORIG. PLAST)

- ① Yellowish white Layer - SOFT - LIME, LIMESTONE, haematite
 + Yellow OCHRE 20 μ
 size range
- ② Partly core type 1st stucco layer
 Partly Brown base coat

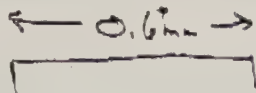
NO PORT. CEMENT LIKELY

SEM Port Cement / Len
 No sign of leaching
 Much iron
 Incrustation on Opie

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P.9

#117

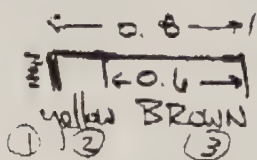


(25 AUG 89
W L-1
YELLOW-BROWN
LEAF)

p 8

BROWN BASE COAT MATERIAL — CRUSHED LIMESTONE
COMPLETELY LEACHED OUT OF IT.
APPEARS ALSO TO HAVE ORGANIC MATERIAL IN IT
(HEAVY OIL — NOT VISIBLE, BUT COLOR IS DARK AND
ACID ATTACK → MUCILY RESIDUE)

#118

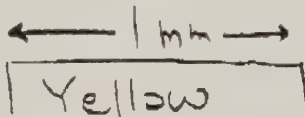


(25 AUG 89
N L-1
ORIG. INDIAN SKIN)

(THIS IS MUCH LIKE #106)

- ① SURFACE OF YELLOW LAYER MAY HAVE VARNISH RESIDUE
NOT VISIBLE AS LAYER, BUT WETS WATER POORLY & SKIN
IS LEFT AFTER ACID ATTACK
- ② YELLOW LAYER — NO COARSE SAND, — FINE OCHRE, LIME, LIMESTONE
WEATHERING HAS FADED THE PIGMENTS.
- ③ BROWN LAYER 60% SAND (RIVER TYPE)
SAME AS BROWN BASE COAT MTL.

#119



(25 AUG 89
S L-1
REST. LETTERING)

SOFT

50% CRUSHED SILICA SAND (Remainder lime, limst.)

THIS IS LIKE CORE SAMPLE 2nd Stucco Layer, except more
SAND, — ALSO YELLOW COLOR IS VERY INTENSE — MORE
YELLOW IRON OXIDE OR BETTER GRADE USED

SAMPLE CONTAINS ORGANIC MATERIAL — AFTER HCL
TREATMENT COHERENT MASS FORMS & DURING BUBBLING THE
BUBBLES FORM SURFACE SCUM.

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P.10

p 9

#120 MIXTURE OF BLACK + OFF WHITE MATERIALS

(25 AUG 89
E L-12
REST. OVER ORIG
PLASTERBLACK = LIKELY FROM BROWN BASE COAT (MINOR PORTION
OF SAMPLE)
VERY HARD (PORT. CEMENT)55% SAND - River type Dark sand
much haematite + black iron oxides.OFF WHITE (MAJOR PORTION OF SAMPLE)
MED. HARD

50% COARSE CRUSHED MARBLE

Limonite, goethite type yellow iron oxides
appear to have faded...

50% Fine pigment + lime

#121

(25 AUG 89
N L-1
REST. UNDER BOOTLIGHT BROWN MIXTURE - LIKELY 2 LAYERS, BOTH
DEGENERATE WITH FADING.VERY HIGH PIGMENT CONCENTRATION - GRANULAR (20%)
MOSTLY (80%)

10-25% SILICA SAND

10% CaCO_3 from lime?

#123

OILY PIGMENT 80%
 CaCO_3 20%(26 AUG 89
N/E L-2
REST LAND BKGRNDVERY DIRTY BROWN COLOR - ACID \rightarrow MUSHY COHERENT MASS
A GOOD CANDIDATE FOR STEARATE ANALYSIS

#124

(26 AUG 89
 S L-3
 BROWN BASE COAT)

p 10

THIS IS BROWN BASE COAT WITH
 CONCRETE FROM BEHIND ATTACHED
 SEVERELY DAMAGED BY (OXIDATION?) AND BY
 CALCIUM CARBONATE DEPOSITION (LIME ATTACK?)

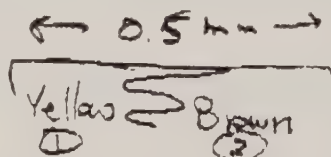
#125

(26 AUG 89
 S/E L-5
 REST. PAINT/PLASTER)

THIS IS BASE COAT + 2nd Stucco Layer
 IT WETS WATER POORLY - ORGANIC OILY MATERIAL
 LIKELY PRESENT

#126

2 Layers



(26 AUG 89
 E L-12
 ORIG + REST)

① FINE PIGMENT, CLAY? NO COARSE SAND
 (Y. OCHRE)

HIGH SILICA, LIKELY PORT. CEMENT BASE PARTLY

② CHOCOLATE

30% SILICA SAND

40% PIGMENT (GRANULAR, 20µ) Burned Umber?
 (ORGANICS?) ~20% CARBONATES

SAMPLE CONTAINS ORGANICS (OILS) which coat the
 grains, protecting them from acid attack (HCl) + forming
 Scum on the water droplet.

#130

VERY LITTLE SAMPLE

(25 JUL 89)
N/W L-13
SKIN

p 11

50% DARK SAND - MUCH LIKE ^{BROWN} BASE COAT
MAYBE MORE PIGMENT [^] THAN CORE BASE COAT
(UMBER TYPE)

#137

TAN

(24 JUL 89
REST. PLASTER
BEFORE CLEANING)

TAN with DARK COATING ON ONE SIDE

40% COARSE CRUSHED MARBLE (LARGE GRAINS)
~ 20% PORTLAND CEMENT BASE (Very Hard)
~ 20% LIME (NOW CaCO_3)

ACID CAUSES IRON PIGMENT COLOR TO COME OUT (Yellow)

SAMPLE HIGH IN OILS - VERY SLOW TO DISSOLVE IN ACID - SCUM

#138

VERY LITTLE SAMPLE

(26 AUG 89
ORIG. PLASTER)

40% CRUSHED ^{COARSE} MARBLE
40% FINE YELLOW Iron Oxide line
20% FINE CRUSHED MARBLE

ATTACHMENT V

PHASE I
PRESERVATION TREATMENT REPORT

The treatment was executed in July and August of 1989.

The entire surface was sprayed with a solution of Quaternary Ammonium Chlorides at one half percent in city water. The solution was allowed to dwell for several days, as an initial safety and moldicide treatment.

The entire surface was then sprayed with a solution of one percent pine oil, one half percent quaternary chlorides, and one percent surfactants in city water. The product was "Pine Plus", a proprietary cleaning agent by Mission Laboratories in Los Angeles, California.

Starting at the top of the column, each area was sprayed with the pine oil solution. Surfaces were agitated with natural tampico brushes to loosen hardened, cross linked oils. In some areas flakes of brittle restoration layers were removed, revealing hidden layers of mold and/or original plaster.

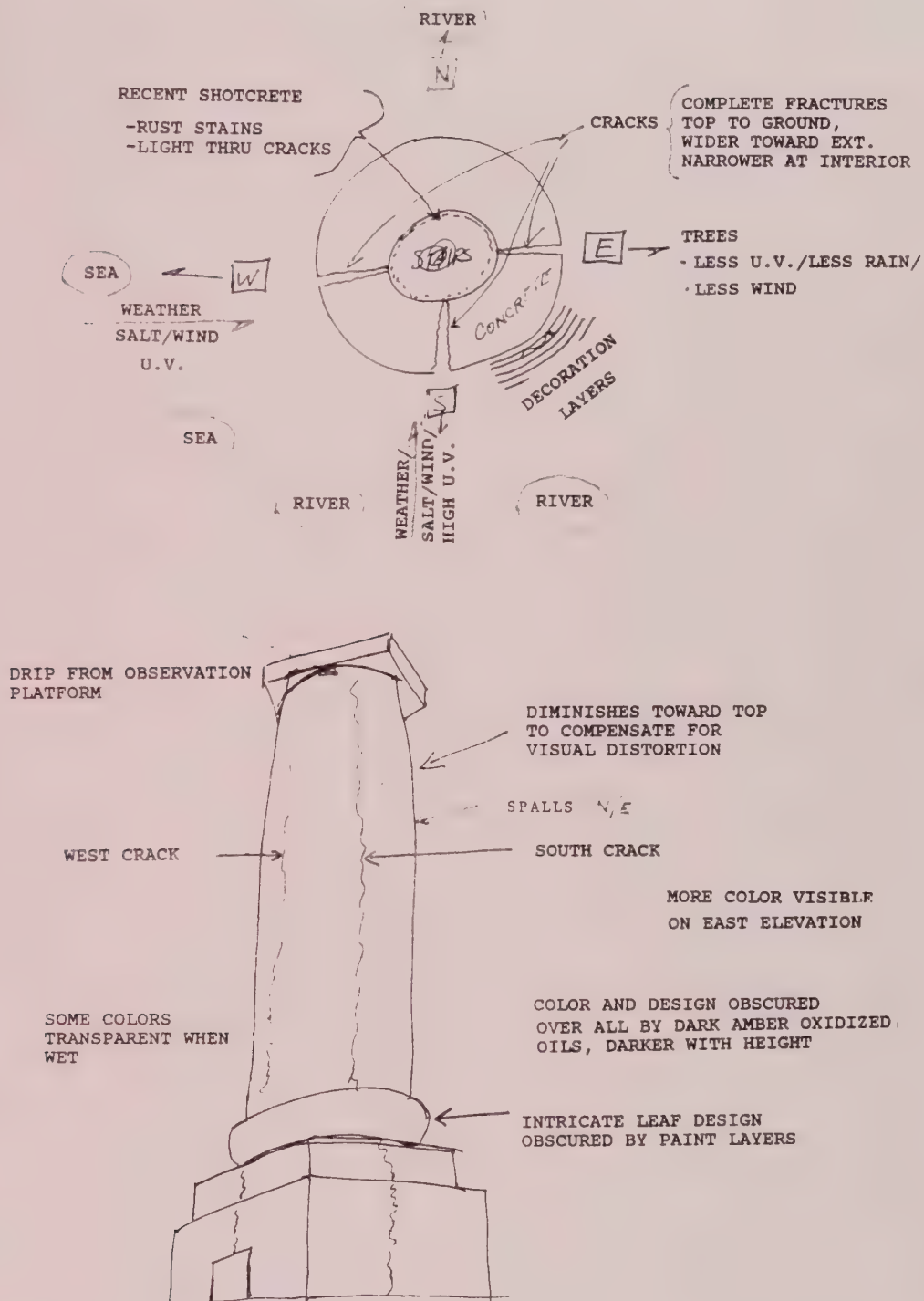
Each area was then rinsed with the Quaternary Ammonium Chloride solution to rinse away residues of tung oil and pine oil solvent.

Each area was once again rinsed with a reduced solution of Quaternary Ammonium Chloride solution and allowed to remain as a long term moldicide.

The entire column was then inspected in detail to determine the types of damage and the quantity of damage, as described in the section of this report titled "CONDITION". We were assisted in the inspection by Art Johnson of KPFF Consulting Engineers of Portland, Oregon.

Finally, all extant carvings in deteriorated areas were lined in white chalk and photographed in detail. The chalk marks reveal the unexpected intricate detail and quality of the artists original work.

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ASTORIA COLUMN

INSPECTION NOTES

STRUCTURE

FEB 90

COSTS

ESTIMATED COSTS FOR PHASE II

REPAIR AND AESTHETIC RESTORATIONS

IN VIEW OF THE NUMEROUS UNCERTAINTIES OF WEATHER, MATERIALS
AND SPEED OF WORK ALL COSTS INCLUDE 40% CONTINGENCY

TIME:.....	ALLOW	\$207,360
MATERIALS.....	ALLOW	\$ 20,000
EQUIPMENT.....	ALLOW	\$ 5,000
SECURITY FENCE.....	ALLOW	\$ 3,000
SCAFFOLDING.....	OPTION I.....ALLOW (OPTION II.. ALLOW \$ 36,000)	\$ 12,000
TRAVEL/AUTO/PER DIEM.....	ALLOW	\$ 12,500
INSURANCE (RATES VARY YEARLY).	ALLOW	<u>\$ 15,000</u>
SUB TOTAL.....		\$274,860
BONDING (RATES VARY WITH LOCATION)	ALLOW 5%	<u>\$ 13,743</u>
SUB TOTAL.....		\$288,603
OVERHEAD.....	25%	<u>\$ 72,151</u>
SUB TOTAL.....		\$360,754
PROFIT.....	15%.....	<u>\$ 54,113</u>
GRAND TOTAL WITH 40% CONTINGENCY.....		\$414,867

CONTRACT CONDITIONS ARE COST PLUS OVERHEAD AND PROFIT

24.001.023

